AN EVALUATION OF COMPOSITION ORNAMENT IN BRITAIN FROM THE LATE EIGHTEENTH TO THE EARLY TWENTIETH CENTURY

Victoria Jayne Doran

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—The principal ingredients are glue, water, linseed-oil, rosin, and whiting, which are combined in such proportions as to make a mixture soft enough for working, while, at the same time, it should be so tough as not to crack, and should harden in a few hours if the ornament be thin, or in a day or two if it be more massive. The state in which it is used by the ornament maker is that of a stiff dough; and the making of it resembles the process by which the baker makes his dough.

Ernest Spon, *Workshop Receipts for Manufacturers and Scientific Amateurs* (1909).

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Abstract

The purpose of this thesis is to evaluate current adverse attitudes to composition objects. It examines reasons for their appearance from a technical and an historical perspective.

The stimulus for this research lay in the current dwindling stock of objects, most specifically picture frames and the tools used to create their applied compo decoration, the moulds. Objects have often been neglected because they were in poor condition, perpetuating adverse attitudes. These objects will soon disappear altogether if their historic value is not more widely recognised.

- The aim of this reassessment is to influence curators and conservators with regard to present and future restoration/conservation policy for compo objects. This evaluation draws out reasons for conservation based on a hierarchy of value.

A study of this kind inevitably combines approaches and content from conservation and design history. It recognises the increasing need for the interdependence of these disciplines, and the mutual professional recognition of dialogue between them. Analysis is weighted in favour of historical and documentary research, as opposed to practical or scientific research because the craft-based nature of compo making challenges the usefulness of such analysis.

The time span under consideration is deliberately wide, to provide a more complete overview of the development of compo in Britain. Analysis and discussion draws on both objects and strands of research that are deliberately selective to illustrate the more common difficulties faced by curators and conservators in decision making.

Chapters One and Two consider the history of materials and the techniques of production. Practical tests based on historical recipes disclosed the relative working properties and the contributions of the main constituents to given formulae. This assisted in the understanding of how compo developed, how its working properties vary and the level of skill required to make it. The small number of recipes recorded reflects a level of secrecy and misinformation within the trade that produced such a huge quantity of objects.

Research revealed the surprisingly late introduction of machines specifically for frame-making (in the late 1860s) compared with those developed for carving wood; and also revealed evidence for the continued production of wooden moulds. Patents indicate that it was not until the end of the nineteenth century that machinery was capable of "replicating" many stages in the production of a basic picture frame. In short, machines only assisted hand-craft techniques.

Chapter Three examines trade structure through specialist compo manufacturers like George Jackson & Sons. The evidence indicates that compo probably did make its batch production debut through a firm like Jackson's in London, in a wide architectural context. However there is no contemporary evidence to link Jackson's to Adam and it could have been one of many firms who first used composition in this country. The Jackson customer account books in particular indicate that the trade had made the change from carving to compo some years before 1805, at which point the

trade seems to have been dominated by the production of frames. Account books also demonstrate that the physical properties of compo permitted and encouraged many divisions in the stages of production. Machine technology augmented the manual processes, adding another level of production to the existing set up. Eventually the small number of dedicated machine manufacturers seem to have put many of the smaller traditional producers out of business.

Analysis of production levels indicates that they generally conformed to wider trends throughout the period. However, prices were initially very high, though cheaper than carving, challenging the view that batch produced objects were typically for mass markets at low prices. The stages of production in the manufacturing process were eventually cut to reduce prices, compromising quality even before the introduction of machines. The final chapter examines the way compo was marketed, deriving largely from retail literature. Early evidence indicates that it was both imitative and innovative, giving valued enrichment to objects up to the middle of the nineteenth century, only beginning to detract when quality began to decline.

The research indicates the importance of the complex nature of production not hitherto appreciated; it is not a simplistic model of change from high quality carving to poor quality compo. It is only possible to understand this via an in depth study of the production process, which is further confirmed by retailing literature. Compo, hitherto dismissed by scholars, curators and often conservators as cheap imitation, lies at the heart of developments in the decorative arts that led to machine production in the nineteenth century. It is crucial to preserve examples of compo work and log their variety before this important phase in decorative art history crumbles before us. This study provides a basis from which decisions about the preservation of compo objects can be reached.

Introduction

The impetus for this thesis lies in the fact that the current stock of compo objects is still rapidly declining despite a certain amount of recognition, mainly in the last decade.[1] If these objects are not recognised for their historical importance and thus preserved, the dwindling supply of exemplars of compo work, in addition to the tools of trade, the moulds, will soon be lost.

Compo objects, particularly picture frames, have often been disregarded because they are (and were in the past) frequently found in a broken and chipped condition. Paradoxically, this was partly as a result of the poor storage conditions and treatment they have received, precisely because they have been undervalued and partly due to the inherent instability of the material itself. Compo objects have been further undervalued because they were batch produced. When considering object based evidence, this thesis takes into account that many pieces have been restored, in many cases very badly. However, discussion and argument is based, as far as possible, on what the author recognises as original evidence.

- This body of research aims to provide some assistance for the museum professional in forming and maintaining more representative collections, through the identification of the more significant periods of development in the history of compo ornament.

This thesis synthesises, for the first time, a history of composition ornament, most particularly within the development of the picture frame. A broad, general approach is taken to the European context and to the different forms of composition that map the development towards the familiar four-ingredient material (scotch glue, rosin, raw linseed oil and whiting) noted in Britain in the late eighteenth century. The inception of the four-ingredient compo in this country is then considered, followed by an examination of this material in Britain up to *c.*1900, to assess whether it was subject to any real further developments, or whether changes noted in recipes ceased to be very significant. Therefore, the narrative and discussion draws upon a large quantity

of disparate material to highlight the most important chronological periods of historical and technical change and the reasons behind those changes.

This is also a combined conservation/history M.Phil., which acknowledges the increasing interdependence of approach and professional recognition of dialogue between two disciplines. Analysis is weighted in favour of historical as opposed to technical research because dedicated scientific analysis would be required to identify specific differences in historic examples. Although this *may* identify different manufacturers, there are problems with this approach.[2] What is important however is a technical understanding of the material that underpins any investigation of production.

Historical analysis, used in conjunction with practical information has helped to confirm or contradict certain information. For example, early day books and customer account ledgers show that different design elements were the product of different manufacturers. Therefore, one frame may bear the hallmarks, both in design and material terms, of a variety of firms, considered in the chapter on trade structure.

There were several major ways in which ornament could be created: either carved by hand, often in wood and before the nineteenth century; hand-modelled, generally in lime plaster; or cast using a suitable material from a mould. These methods had all long been extant at the beginning of compo's popularity in the late eighteenth century. However compo was different in having a set of physical properties that included being particularly suitable to the production of flexible casts that retained their shape while being applied to curved substrates. Furthermore, the materials used permitted precision casts with a degree of bulk to be produced without too much shrinkage or cracking.[3]

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[1] *The Art of the Picture Frame* [1] and *Frameworks* [2] are two of the best known of recent publications that include short sections on the compo picture frame.

[2] First, simple tests revealed the variable craft-based nature of compo, which makes attribution to single workshops difficult, if not completely impractical. Second, documentary research has revealed that design elements from different manufacturers were combined on individual objects. See Appendix V.

[3] These problems can manifest themselves through the intrinsic deterioration mechanisms even when the ratio of ingredients are correct.

The catalyst for the development and use of compo came from a need to create decoration in a more expedient way than the hand carving of wood. This is seen in terms of the speed at which ornament could be produced and thus labour costs, though there are important qualifications on both accounts. Compo objects are highly varied in quality, both in terms of production, design and application. This thesis examines whether there was a streamlining of application from a broader architectural use in the late eighteenth century to a narrower application, mainly in picture frames, due partly to the level of demand in this area, and the suitability of compo (versus other materials) for picture frames.

To address how the material developed, Chapters One and Two consider compo as a material and looks at the techniques involved in its manufacture, from small-scale manual production to machine assisted examples. The craft-based nature of the trade manuals from which the majority of recipes have been sourced, provide a guide to potential developments of the material during the course of the nineteenth century. A craft-based approach is defined here as special manual skills or techniques based on the craftsman's own judgement.

However, the lack of patent recipes indicates a level of trade secrecy and misinformation surrounding recipes. A greater insight into the manual technology of compo has been gained from factory/workshop visits, and through interviews with craftsmen of long standing experience with the material. The understanding of practice, that is often undocumented tacit knowledge via studio based tests and sessions with compo craftsmen has been crucial to the interpretation of historical and textual sources, leading to a working knowledge of how compo the material developed, its technical potential and limitations.

Chapter Three, on the organisation of production, first explores the origins of the batch production of compo in this country. Examples such as the Northumberland House saloon represent important conservational anecdotes that illustrate the reality of attitudes to objects in conservation, and their resulting chances of survival. For example, the spangle glass saloon survived because it was regarded as a highly unusual example of Adam's work at the time of the demolition of the house in the late

nineteenth century. Examples used are deliberately selective to illustrate problems commonly faced by conservators and curators.

Evidence challenges existing notions of compo as a purely low level, mass produced ornament for consumption at the lower end of the market. To this end, day books and ledgers, particularly the Jackson customer account book (1805-17), provide much new information. For example, in addition to further informing our understanding of manufacturing techniques, they provide very precise details of cost, (Chapter Five) and the exact nature and quantity of output (Chapter Four) at a time when compo was thought to have largely superseded traditional wood carving, at least for picture frames.

Chapter Three also considers the effect of the machine on the manual production process. Evidence is difficult to locate in this area. For example, diagrams and specifications of patent machinery, considered in Chapter Two, seem to represent the only surviving record of the use of machinery in this country. It is therefore difficult to fully appreciate its real impact on production levels, particularly as relatively few catalogues of machine-made examples seem to have survived.[4] The interpretation of technical evidence drawn from the objects themselves is particularly useful here.

Further difficulty exists in a thorough appreciation of the diagnostic features of machine produced compo designs (discussed in Chapter Two). Some of the best machine made examples whose date can be traced through a maker's label, seem to be far rarer than suggested by the little surviving documentary evidence. This indicates that these objects have been regarded as dispensable examples of the frame-maker's output. In order to overcome some of these problems and place the compo evidence in perspective, contemporary woodcarving machinery presents a useful model of comparison.

Retail evidence forms the main focus for the final chapter, which aims to determine whether compo was marketed and indeed regarded as an innovative material,

[4] Recognising such a catalogue may require a corresponding piece of evidence and is often a process of deduction based on a variety of factors, some of which will be considered during the course of this thesis.

challenging prevailing current attitudes. The level at which composition was marketed, whether at a "high" or "low" level, (particularly in terms of the quality of the goods and the type of consumer) and how that may have changed is a further issue. Again, the extent to which advertising reflects a narrowing of application is important, as is the evidence for changing attitudes of the manufacturer, retailer and consumer.

As with the section on production, so in retailing, the weight of existing evidence lies in the first half of the nineteenth century, again due to the scarcity of archival and documentary evidence on machine produced or assisted examples. Furthermore, evidence of attitudes lies far more with the manufacturer and retailer than the consumer, though this is often the most revealing type of evidence because it provides precise information about the market, even in what is excluded or concealed. On the other hand, the context of consumer attitudes, such as diaries, letters and novels can be too removed to be very revealing.

Again, this illustrates the importance of keeping records. The reasons for the survival of an object can be unexpected and it is often the unusual or costly goods or designs at the top end of the market that survive. Thus paradoxically, the cheaper batch produced objects can be far rarer than anticipated and those objects which represented the majority of output are lost, resulting in an unbalanced view of a small but important part of history in the decorative arts. This confronts the whole process of conservation and stresses the need to exercise careful judgement on the part of both the curator and conservator in the decision making process.

This integrated approach to conservation studies, though recognised, is still fairly rare, but it is felt that this thesis demonstrates the need for a more systematic, almost archaeological approach if new ground is to be broken.[5] For example, uncovering layers of physical evidence, whether it be practical or historical, to provide a more accurate, detailed and complete picture. It is anticipated that one result will be to

[5] The research of Magda Kozera (Ph.D. student, V&A/RCA Conservation Course) into photographic frames and mounts, is another noteworthy example of this synthesised approach. Other work includes Carlyle [3]. The latter body of work exemplifies the integration of technical and art historical research.

encourage greater collaboration between curators and conservators for the greater good of collections of compo objects and others.

A Brief Review of Frame Studies

As picture frames will form a key part of any study of compo, it is worth briefly considering the focus and context of previous investigation. With few exceptions, frame studies did not really exist before the 1980s [4, 5, 6].

The need for a re-framing policy was recognised as early as 1935 at the Victoria & Albert Museum. Martin Hardie, Keeper of the Department of Paintings was opposed to the gold mounts and heavy frames, originally employed to elevate the status of new vibrant works in the first half of the nineteenth century:

> We must all have seen vaporous masterpieces of Turner's later period killed by their gilt surround and elaborate fame, ruined as would be the iridescence of a butterfly if it were pinned down on a sheet of burnished gold [7, p. 226].

This demonstrates some of the ethical problems faced by curators when considering the framing of historic works. Paradoxically, these words were to find specific favour as late as 1994 when two works were re-framed in stark white, acid free mounts and basic gold slip frames. This involved removing the 1850s compo frames that reflected the taste of the collector Richard Ellison. However, it was under the direction of Hardie that a re-framing policy was implemented:

> ...to get rid of all the gold mounts and to change what a recent writer has described as "serried ranks of plummy Victorian pieces in heavy frames and broad gold mounts" into a more orderly arrangement of water-colours, shown in historical sequence, in simple frames with mounts of white or cream with bordering lines and washes [7, p. 225].

Analysis is dependent on the context in which the frame is considered and the perspective of that analysis. Much of the research (and exhibitions) during the 1980s was of an "art historical" nature, often considering the relationship of the frame to the works of a specific painter [8], though a number of papers take a broader approach [9, 10, 11, 12]. The very fact that a need for consistent nomenclature in frame studies was identified at this time indicates the growing interest and importance of the field [13].

It has been recognised for some years that batch production frames should be considered as objects of importance in their own right, not least for the important works that they frequently surround. Indeed, many museums and galleries have only surveyed their collections within the last few years and many still have much work to do [14]. The need for such research is occasionally well defined:

> Increasingly, auction room catalogues read like art historical monographs, but the immense amount of research undertaken by their staff on specific major items is not matched by the information available on more modest productions, and this lack of a secure context is a fundamental weakness in framing studies and consequently for the development of framing connoisseurship during the 1990s [15, pp. 187-8].

Frames studies generally lag behind other decorative objects precisely because of their subordinate function, and inevitably:

> Adjusting an antique picture frame to fit another painting of different size cannot but impose a degree of intervention, which under normal conditions would be unacceptable in the treatment of other classes of works of art [16, p. 3].

A variety of methods have been used in the analysis and categorisation of picture frames: "The frame's close relationship with other areas of study means that it can be interpreted in a variety of ways, in turn opening up further avenues of investigation."[1] This statement alone summarises the difficulties involved.

Frame history can be viewed and investigated within at least three potential categories: frame history as "art history", frame history seen as part of the history of the decorative arts, and frame history as social and cultural history. If a frame is analysed as a part of the history of the decorative arts, its place within the interior might be a primary consideration, whereas its relationship with the painting might be the main focus for analysis as part of "art history". Quite a number of papers and publications deal with the latter, such as: *In Perfect Harmony* [18], although there is still much ground to be covered in terms of the environment in which frames were originally

[1] Peter Cannon-Brookes quoting from William Rubin, (Director of the Department of Painting and Sculpture, Museum of Modern Art, New York) in a comment to the *New York Times*. See Ortega y Gasset [17].

displayed. This is perhaps because it is a difficult issue for museums in terms of the re-creation of that environment, though it is ultimately no less important.

The gathering of information for frames and other objects is often broken down into three basic categories, as defined by Thea Burns in her paper, 'The Historic Framing and Presentation of European Pastel Portraits in the Early Eighteenth Century'.[2] Here, evidence is divided into the artifactual, the pictorial and the written. However, if such material is gathered merely from a curatorial perspective for example, a comprehensive understanding of manufacturing techniques necessary to inform other types of evidence is usually inadequate.

Despite the recognised need for research at the batch production end of the market, exhibitions and publications on this have been very limited. Compo is considered in a number of more recent publications, although the interest and emphasis has been primarily on those frames made for an elite market and usually of carved wood [20, 2, 1, 21]. Within these publications, the importance of acknowledging the use of compo as part of the history of frames has been recognised. However, compo frames are rarely considered in any depth and fundamental considerations, such the technical reasons for their appearance, are overlooked. It is often said that "Because many of them are of composition, they appear to possess an iron-like hardness of edge and general brassiness" [20, p. 68]. The fact that the cast ornament on high quality examples exhibits the unique, hand carved characteristics of the moulds used to create them, is usually overlooked. Furthermore, the examples cited within the above quotation were both heavily over-gilded, obscuring the detail of the original casts and the finish.

Compo frames have most frequently been considered from a purely curatorial perspective, and when they have been considered by the conservator it is often with regard to the techniques and materials involved in their restoration, focusing on the finish or coating.[3] Therefore, any conclusions regarding the future treatment of similar objects are often limited to conservation techniques.

[2] In Bell [19, p. 10].
[3] See Green, Malcolm, 'Thirty Year of Gilding Conservation at the Victoria and Albert Museum'; Hückel, Angela, 'Picture Frames in the Nineteenth Century'; 'The Characterization and Treatment of Gilded Surfaces on an Early Nineteenth-Century Harp', in Biglow [21].

The Art of the Picture Frame examines British portrait frames decorated in compo, in some detail [1]. Examples are discussed with regard to their ornament in conjunction with artists, patrons and their tastes. In addition, frame-makers and associated material such as labels and bills of sale are consulted, together with many other valuable sources. Production techniques and their bearing on the structure of the trade are not really discussed however. Although there are a number of references to the ways in which the trade may have functioned, the author acknowledges the great scope for further research: "The nineteenth century has only just begun to be seriously explored by those interested in the history of framemakers".

This thesis differs from these surveys because it considers many aspects of the production process and the varied applications of composition ornament for the first time, drawing on a wide range of diverse evidence. It also looks at many of the more representative examples of composition production; rather than those examples which have hitherto been regarded as the finest, but which are frequently the exceptions in any large collection rather than the rule.[4] The broad time span of this research also takes into account the narrowing of the application of compo from the broader architectural context, thus objects other than picture frames are also considered.

The literature search for this thesis was systematic and fairly broad, encompassing many of the major document archives in London and a smaller number in the provinces. Very rapidly it was clear that most of the more obvious potential sources such as the early encyclopaedia and dictionaries did not contain any information of direct relevance to this thesis, hence their absence from bibliographic references. The search became gradually more responsive to those sources which proved fruitful, and current references include a small part of an initially much larger list.

[4] For example, the collection of the Guildhall Art Gallery, City of London. Although many frames were lost during and soon after the war, many Victorian frames remain with their original pictures, though few might be regarded as aesthetically important. However, such collections do contain a vast quantity of untapped information about the greater part of the frame-making trade, and if this thesis did not offer representative examples it would fail to be of use to these institutions.

Chapter One: Composition the Material

In the history of the decorative arts, many different materials have been used to create relief ornament. This thesis is specifically concerned with one of these materials which is described as "composition" or "compo". Unfortunately these terms have often been used generically or indiscriminately to describe materials which, while relevant in any comparative discussion, are not the primary concern of this research. This can cause confusion in the interpretation of historical documents and in discussions of both an historical and technical nature. To avoid such confusion, it is important to establish at the outset a definition of "composition" which establishes the focus for the investigation and discussion.

Today, "composition" and "compo" are most generally used to describe a particular material composed of four major ingredients (raw linseed oil, rosin, scotch glue and whiting or whitening) and possibly several other minor components.[1] This thesis is specifically concerned with composition or compo so defined. However, it is necessary to broaden the definition slightly in the consideration of historical sources. As late as 1823, recipes were provided which omitted one or more of these major ingredients. However, such accounts are clearly relevant to our understanding of the development of the material in the late seventeenth and eighteenth centuries. It is important to note such examples for the sake of completeness and to include secondary contextual information on the European development of moulding materials associated with compo, particularly the French contribution.

Before narrowing the discussion to the development of materials that comply with this definition, it is worth providing a very brief account of other materials that have been used for the creation of relief ornament, noting how the confusion over terminology can arise.

An early approach to making repeat patterns from shallow moulds or by building up layers, popular in fifteenth century Italy, was to use a mass containing only gypsum and animal glue.[2] This is often referred to as pastiglia, which describes the technique

[1] See Glossary.
[2] See both "gesso" and "whiting" in Glossary.

as opposed to the material and is seen most particularly on picture frames and cassoni (**Fig. 1**). One reference mentions "separate impressions taken from wood or metal moulds and set in place while still flexible" [22, p. 116] (**Fig. 2**). Indeed, Claus Grimm in *The Book of Picture Frames* refers to early Italian frames where pastiglia work is applied over the curved surfaces [23, p. 10]. A similar method can be seen in England, as early as the fourteenth century using whiting as the filler (**Fig. 3**).[3] These two simple ingredients were adequate for simple, shallow casts but would not set properly in any bulk as large fissures would occur due to shrinkage from water evaporation. Such shallow casts were also lacking in strength and flexibility, which limited their use in any thickness on curved surfaces. They certainly could not be stretched along their length into position.

Papier mâché was well known before composition in Britain and continued to be one of its most important rivals. Producers include Robert Boyle who promoted its use for picture frames as early as 1672 and René Duffour.[4] There are many notable eighteenth century examples of borders or "fillets" in houses such as Felbrigg, Doddington, Osterley and Kedleston (**Fig. 4**). In terms of continental examples of the material, Millar's text (1927) mentions that "The dome of the Palais de Justice of Brussels, which weighs 16 tons, is composed of this material". This indicates some of the superior characteristics of papier mâché, notably its strength and light weight. Cost was also an important consideration.[5] Nineteenth century manufacturers included E. F. Bielefeld, Cubbitt & Co., Jennens and Bettridge and Jackson's (**Fig. 5**).

Papier mâché was produced in two basic ways from at least as early as the mid eighteenth century; either by mashing the paper to a pulp or layering glued papers together and placed under high pressure until the layers became laminated. Both these techniques continued to be used into the mid nineteenth century, employing different ingredients in the paste, different types of paper and various methods of mashing and pressing the pulp or paper. These procedures were eventually effected by machine towards the middle of the nineteenth century. It is important to recognise from the outset that materials and techniques for papier mâché were in a constant state

[3] See "whiting" in Glossary.
[4] See Glossary.

of change and development. Advertising and examples of usage, considered shortly, suggest that there was a particular burst of activity in "improvements" during the 1830s. However papier mâché in one form or another had never disappeared, so its use as a viable alternative to compo was always present. Without a separate study into papier mâché, it is difficult to assess whether the sudden advertising of "improvements" really reflected significant developments at this point. It may be that there was such a good market for moulded ornament that the manufacturer sought to increase the apparent choices for the consumer at this particular time. On the other hand, developments may have been more subtle, but were very significant commercially.

Certainly the appearance of carton pierre in the 1830s was another material which augmented the range of materials available to the consumer. This material was a refined version of papier mâché that underwent further modifications in the following years. The basic recipe relied on paper pulp, the refinements included the addition of plaster, which enabled very crisp, fine impressions. There is a reported difference between the English and French varieties in that the French was more brittle due to the greater quantity of whiting in the recipes to reduce the setting time [25, p. 395]. The material produced by Jackson's is very tough, with a hard stone-like quality, but not brittle like plaster of Paris. It has a fine surface texture, nearly as smooth as compo, but is paler in colour and more towards yellow tones than beige/brown. This durable material seems to have been ideally suited to the production of ornament with deep undercuts popular in the 1840s however it is not thermoplastic and therefore could not be stretched in a flexible state to fit curved surfaces perfectly. This material can be traced back to at least early seventeenth century France. The Louis XIII boiseries of the interiors of the Château de Cormatin, dating from the 1620s are said to be made partly of carton pierre or carton-bouillé [2, p. 157]. There are many examples of carton pierre work particularly from the second half of the nineteenth century including Kilmainham Hospital in Dublin carried out by Jackson's [26].[6]

[5] Bielefeld's frames were said to be about two thirds of the cost of those enriched with compo ornament [24, p. 257].
[6] See also Glossary.

Another early material used extensively in the Italian Baroque period and in England in eighteenth and nineteenth century Baroque revival patterns was a material called "bulk gold" [23, p. 7]. Descriptions of its ingredients are ambiguous and suggest that it did not contain linseed oil but more research is required to establish whether its other ingredients were close to those of compo and thus whether there may have been any developmental connection [23, p. 7].

There is certainly compelling evidence for the use of moulding materials on picture frames in early eighteenth century France. It is not known however, whether the same or a similar formulation as the four-ingredient material that became familiar in Britain was employed. For example, the court case in the 1720s of the frame-makers André Tramblin and his son-in-law Pierre Delaunay whose frames were purchased as carved but found to be of a moulded composition. Despite opposition from the master carvers, the Parisian courts ruled in 1723 that *ouvrages de composition* should be legalised. In 1724, the influential Académie de St Luc voted to allow the use of "compo" by its members, provided it was labelled as such. Although this vote was rescinded in 1727, legalisation brought a certain acceptance as Delaunay's "composition" frames were being recommended to aristocratic patrons by mid-century as an alternative to carved frames [20, p. 41].[7]

Other materials, forms of which were used in the eighteenth century, are worthy of mention here to clarify their status with regard to the use of moulding materials for the production of ornament. Cement for example made one of its first appearances in the second half of the eighteenth century as Roman cement. This was gradually superseded by Portland cement in the 1840s. Rapid set times meant these materials could easily be cast. However, like the patents of the Adam brothers, they were primarily used for external work.[8] Coade stone is another batch produced artificial material introduced in the latter part of the eighteenth century for both exterior and interior situations. However it is a partially vitrified clay and thus quite different from the formulae with which this thesis is concerned.[9] Finally, stucco and plaster are examples of words that are frequently used interchangeably but have regional

[7] No examples of these frames have been located.
[8] Doran, Victoria, unpublished research into the involvement of the Adam brothers with patent compositions for exterior work.

variations. True plaster or plaster of Paris is in fact gypsum based. However interior plasterwork of the eighteenth century and earlier in this country was largely lime-based. Stucco is an Italian term that is generally associated with lime-based mortar, but it is often used in a broader sense to refer to any part of the plasterer's craft both for exterior and interior use, modern and historical.[10]

Plaster of Paris is a material that has been used by some of the earliest civilisations for the casting of decorative enrichments although it seems not to have been used (by itself), for large-scale operations due to its soft and brittle nature.[11] The setting process is rapid and, unlike many other moulding materials, casts do not shrink. Hence it has been used extensively in casting to create the negative for the final cast.

Fibrous plaster (or slab) was another significant material which is recorded by a number of sources to have been invented by the Frenchman De Sachet, who took out a patent in 1856.[12] The basic advantage of this particular material appears to have been its light weight and the fact that it was "self supporting"; in other words it did not require a wooden substrate for support as this section could be cast as part of the entire strip of ornament.

With regard to compo, without the objects that can be firmly dated, and no recipe or even set of ingredients, it is difficult or impossible to determine the type of "composition" to which late eighteenth century documentary evidence may refer. One case is illustrated in the trade card in **Fig. 6** (1790s). Here composition is proclaimed as a wonderful new material. Perhaps not surprisingly, however, the exact nature of this material is not elucidated. It may well have referred to the four component material with which this research is concerned, or something slightly different. On the other hand, documents of the same period and earlier do refer specifically to materials such as papier mâché. Thus, where "composition" is used, it suggests a deliberate differentiation.

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[9] See Glossary.
[10] See Glossary.
[11] See Glossary.
[12] See Glossary.

By the mid nineteenth century however, reference can be found which often detail the material and the ingredients, such as this one under the broader heading of "Plastering" [27, p. 426]. The use of applied cast enrichments is described within a detailed description of the plastering techniques used to "run" a cornice for which plaster of Paris was used.

> These ornaments are cast in plaster-of-Paris from clay models, but of late years other substances, lighter and less liable to injury than plaster, have been used, such as carver's compo, consisting of a mixture of whiting, resin, and glue; papier maché, with a priming of whiting and glue over it, when sharp impressions are required; carton pierre, with layers of whiting and glue; and gutta percha. One of the advantages of carver's compo is, that not being brittle, ornaments can be bent about and adjusted while being fixed, or after they are fixed.

It is not known if the omission of oil in the ingredients for "carver's compo" was an oversight on the part of the writer or a statement of fact, based on the genuine knowledge of the author.[13]

Compo or composition was therefore developed from, or in parallel with a range of related materials, for the creation of relief ornament. The evidence for the use of a range of fine moulding materials, particularly in eighteenth century France, strongly suggests a European role in developments, pre large scale batch production. Indeed, papier mâché producers working in London like René Duffour underline this connection. Compo offered some advantages and some disadvantages over other materials, depending on the use intended. Its success, however, relied primarily on certain working properties it possessed as a consequence of its formulation.

Compo is often described as a plastic or thermoplastic material. These terms indicate some important properties. In its freshly prepared state, and for a certain period after its preparation, it can be moulded, trimmed, bent and stretched into shape fit for its intended purpose i.e. it behaves in a plastic manner. This plasticity can also be enhanced by moderate re-heating, hence the use of the term thermoplastic.

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[13] The effect that this would have had on the handling qualities and appearance of the material are investigated in Appendix V.

On the other hand, the use of these terms is misleading. Compo goes through a series of stages in its transition from the fresh plastic state to the dry, hard and brittle state in which we generally encounter it in objects. During the first stage, compo gradually hardens and loses its flexibility at room temperature (through loss of water) but remains highly sensitive to moisture and recovers its plasticity (and workability) if re-heated. Within a couple of hours, the opportunity to successfully reheat it for reworking can be lost, although the sensitivity to moisture and heat remains.[14] Over a longer period, perhaps two weeks, it becomes progressively less responsive to both heat and water. Eventually, it reaches a stage where heat will no longer restore malleability to a significant degree i.e. it ceases to exhibit any substantial degree of thermoplasticity. However, it is not truly thermosetting because it remains possible to break down the thoroughly dried and set material, for example, by soaking in water.

When aged compo is observed, it is very often cracked and cleaving from the substrate. This indicates the brittleness that develops over a long period. The development of the cracks could be explained by shrinkage and expansion of the compo itself. This in turn could be due to permanent dimensional changes as a result of oxidation, degradation or variable dimensions due to changes in moisture content with varying relative humidity. Alternatively, the cracking may be a consequence of the brittle compo being unable to absorb the stresses imposed by a substrate that is expanding and contracting with humidity change. Indeed both could be happening.

Interestingly, the cracks in compo most often run perpendicular to the grain of the wooden substrate, implying that the cracks occur as a consequence of dimensional change and stresses in the compo itself rather than in the substrate. Cracking usually occurs at the weakest point in the compo or where the cracks can take "the shortest route" and this is most frequently across long thin strips than along them. Equally, large and complex decorations tend to crack in the shallow valleys were the compo is thin and these cracks can bear little relation to the direction of the wood grain.

Another sign of physical degradation sometimes seen in compo is crumbling although this is much less common than cracking.

[14] See the historical account of making compo in Chapter Two.

To explain all these effects is not easy. The properties of each ingredient can be described individually. For example, in its fresh state, linseed oil is a relatively viscous, slow-drying liquid which forms a plastic mass when mixed with sufficient quantities of inert materials such as pigments (or whiting). However, when exposed to air, it is initially subject to oxidative polymerisation and, over a long period, degradation. These chemical changes are accompanied by expansion/decreasing solubility and shrinkage/embrittlement respectively. Similarly, the immediate and long-term properties of glue, rosin and whiting can be considered. However, the important thing about compo is that it is a composite material. The properties of the individual materials may influence the properties of the whole but the combination of materials may lead to new and different properties. There are also additional factors to consider, for example, the relative proportions of the ingredients, whether oil is dispersed in water or vice versa and the particle sizes of the various components in the final material. To better understand the behaviour of compo in its freshly prepared state, after drying and in the long term, it would be necessary to undertake a thorough scientific investigation. This would involve complex analysis of samples of compo from historic objects and attempting to relate the properties observed to the analytical information. It would also involve preparing many samples of fresh composition from known ingredients, varying the proportions and methods of preparation, and comparing the consequences in the materials prepared, both fresh and aged.

Although (to the author's knowledge) no such study has been made to date, this research does not include such analysis, again because of the variable craft-based nature of compo making. This indicates that historic compo samples produced by one manufacturer could vary considerably from one batch to another according to the relative proportions of ingredients combined by a particular craftsman at any given time. This is particularly true when it is remembered that even if the "wet" ingredients were weighed (and a proficient maker may have estimated the "correct" proportions through experience), the quantity of whiting that could be added might depend on other variables such as the temperature of the workshop and the speed at which the compo maker worked. The availability of ingredients is another factor in addition to the variability of their source, which could result in a wide range in quality. The usefulness of scientific data is further to be questioned when Chapter

Three reveals the extent to which design elements from different manufacturers were used on individual objects. Even if comprehensive analysis were to improve current understanding of the complex deterioration mechanisms involved in specific samples of compo, it is usually important that good conservation records of the objects exist. Unfortunately, this is still rare for compo objects. Furthermore, as tests have shown, it would be necessary to distinguish between the affects of deterioration and the poor quality of a recipe from the outset.[15]

However, an account of how compo has been made and used in Britain since the late eighteenth century is provided, based on historical documents and texts. This account must address not only the preparation of composition as a material, but the way in which that material was employed in the production of ornament. The production process may, of course, also affect the performance of the material in both visual and material terms.

[15] See Appendix V. For these reasons, this thesis does report a series of simple, empirical, studio-based, practical experiments which involved making up samples of compo using historic recipes, and making observations on their working properties and the drying process. These practical experiments do not provide a scientific explanation of what influences compo's immediate and long-term properties but they have been of some help in understanding observed properties in historical composition objects.

Chapter Two: A Technical History

Introduction

The technical history is important in establishing the context in which compo ornament was produced and how this context changed.

The following pages provide an account of the technical development of composition as a material and the methods of production of composition ornament. The recipes, techniques and skills required to make composition both on a small-scale manual level and large scale manufacture are discussed, drawing on archival and documentary evidence and on real examples of frames and moulds. The ability to understand how objects have been made, enhanced via this study, is of fundamental importance in assessing their significance as exemplars.

- The first aim of this chapter is to identify the most important periods of activity in technical development.

- Of further importance is the balance at each stage of the history between the commercial production of compo ornament and its employment by amateur and professional craftspeople. This section considers the extent to which traditional techniques and tools continued to be used following the introduction of machinery.

- The technical literature can indicate broadly how the volume of production varied.

- Technical evidence can also provide information on the applications intended for the materials produced. For example, whether developments were linked to a narrowing of application, from architectural use to the production of picture frames.

- This chapter examines the degree of skill invested in production and how this may have changed over time. It explores whether variations and changes in the material and making process are linked to the wide range in quality of product

from the casts from intaglio carved boxwood moulds to the machine-made shallow runs. It also considers the impact of different techniques on the appearance of objects.

Understanding changes in the production process helps to assess, from a technical perspective, whether composition ornament really was merely a poor quality batch production substitute for carved wood or plaster, as is often the prevailing perception today.

It is important to consider developments, and the possible motivations behind them, in each area of technical interest. First, the recipes for the material itself; the "traditional" production process which includes the moulds employed, the pressing and casting procedures and where, when and how the cast mouldings were attached to the substrate. Second, the later developments in machine production of ornaments are examined. In the third section, the diagnostic features of objects are considered for their relevance to the main points here.

Finally the overall patterns of the development of compo production are summarised. In this discussion, the competition with alternative materials and how they may have affected compo is highlighted.

Since developments in each of these areas is inter-linked, it could be argued that a strictly chronological approach would be useful, embracing developments in each area as and when they occur. However, for the sake of narrative clarity, the approach adopted here is to divide the account into these three areas and deal with each chronologically but independently.

1. The Material

Before beginning a discussion in earnest of composition the material, it is worth mentioning that a number of recipes have been erroneously cited in connection with compo in the past.[1] Even where oil is included (one of the ingredients of "true" composition) these recipes are really for cements, to be used in or out of doors, for ceiling runs and decorative cornices. In general they were not intended for the delicate applied ornament which we associate with compo today and the moulds employed in their casting were most commonly made of plaster, as for example in Hamelin's specification of 1817.[2] Within the technical history of compo, there is also much confusion surrounding the Adam, Liardet, Johnson patent stucco of the 1770s. However extensive research indicates that these patents were intended for external stucco, both plain and ornamental.[3]

The first recipe of real note in Britain is that published by Stalker and Parker 1688 who only employed two of the main ingredients, whiting and glue [28, chap. XX]. It is to be remembered that the early date of this recipe, which would yield a "gesso putty" rather than a "true" compo, is very much outside the period with which this thesis is concerned and before the batch production of compo on any scale [29, p. 77].[4] However, this recipe is important here because of the context in which it is presented: "To make good paste, fit to mould or raise carved work on Frames for Guilding [sic]" [28, chap. XX]. This is one of the key applications for which "true" composition was subsequently developed. The account of the working method provided in Stalker and Parker shows how a recipe based on just these two ingredients could provide a material with similar working properties to four ingredient recipes. The implication is that the glue is the key ingredient, but it is important to stress that this recipe is not compo and that it is still at a developmental stage. Tests reinforce the idea that it is the properties of glue, and the proportions included, that are of most

[1] For example, patent specification no. 834 (1765) of Reverend David Wark: a "Composition or stone-paste, made with oils and other things, for the covering of walls, roofs and domes, and for other purposes". No. 1040 (1773) of John Liardet : a "Cement for building purposes" and no. 1150, of John Johnson (1777): a "Composition for covering the fronts and tops of houses and buildings, and for ornamenting the same, and for other purposes."

[2] See Appendix II.

[3] Doran, Victoria, unpublished research into the involvement of the Adam brothers with patent compositions for exterior work.

[4] Cennini tended to use gesso in liquid form and cast it in moulds but his gesso was based on gypsum. Cennini.

importance in producing a successful moulding recipe.[5] In the manual of Stalker and Parker, the capacity of the formulation to set, and provide a material with the desired properties is emphasised. However, the problems associated with a material that can rapidly lose its plasticity are also noted:

knead it very stifly [sic], wrapping it up in a double cloath [sic], in which it may lie and receive some heat from the fire: if you permit it to lie in the cold and harden, twill render it unserviceable.

The first valuable recipe for a material containing the four major ingredients is the 1786 patent formula of Obadiah Westwood, a button manufacturer from Birmingham, for a "Composition for the Manufacture of Trays, caddies, Dressing Cases, Button, & c".[6] Although it employed ground fibres, "mixed with a strong paste made of glue, flour, and water, or isinglass, flour, and water, or other adhesives" it also required that "a small quantity of rosin, [and] oil" be added in addition to "Spanish brown, red lead, or umber, or other binding articles", thus three of compo's major ingredients are now used. As an inert pigment itself, whiting may well have been substituted for "other binding articles", suggesting that various pigments may be used to give similar properties to compo. However it is important to stress than although this recipe could potentially contain the four ingredients by which this paper defines compo, it is actually "more than compo", because the inclusion of flour (with water) constitutes a second adhesive within the formula. Therefore it could be said that this recipe is still within a developmental phase towards a four-ingredient recipe.

This specification is particularly relevant because its applications were "Pictures, Looking Glasses, and other Things, Mouldings, cornices, and Ornaments for Rooms, Cielings [sic], Chimney Pieces, Doors, Pannels [sic]," among other small articles. An oven was used after the kneading stage to "relax or soften the said composition sufficiently to receive impression". At this stage, it is pointed out that the shanks of buttons can be placed in the composition. This recipe remained flexible for a period of time before gelation began to set in, indicated by the specification, that calls for the use of an oven once the composition had been pressed into metal moulds so that it

[5] See Appendix V.
[6] See Appendix II.

"becomes perfectly deprived of flexibility and secure against the penetration of damp or wet".[7]

Again, the description of this material indicates that its flexible qualities, although recognised, were deemed important only in so far as it enabled button shanks to be inserted into the material in the moulds and yet still remain supported within the mould by the material. However, the flexible/handling qualities of this recipe are extremely good and it is therefore hard to believe that its potential as a flexible material was not recognised. It is quite possible that this was deliberately not alluded to within the specification and thus that flexibility was a key factor in development.

That such a formula was felt to be unique enough to be patented, suggests that it was certainly not well known, at least outside London at this time. Other late eighteenth century patent recipes, such as that of William Whitlock and William Hodgson (1772), "applicable to the purposes of carving, casting and modelling" and described as "artificial wood" employed cartridge paper and glue among other ingredients.[8] The few formulae that are patented exist before or around the Westwood patent, a number of them involving other materials such as lead, and glass and not all of these are concerned with the casting of ornament, though many of them are by London patentees.[9]

On balance, there was enough activity to suggest that the 1770s and '80s were a decisive period in the search for an alternative material to those already employed in decoration at this time, for both interior and exterior purposes. However, this is insufficient evidence to clearly indicate a specific quest for a flexible, slow-setting material such as compo.

The fact that the Westwood recipe is the only patent material at this time whose ingredients are close enough to those of compo to be of specific interest to this discussion, may therefore be significant. This suggests that recipes were being developed within the trade but <u>not</u> patented, perhaps primarily for reasons of cost.

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[7] See Appendix V.
[8] See Appendix II.
[9] See Appendix II.

Although a patent would provide a monopoly on the manufacture and sale of the material for fourteen years at this time, the printing of the specification would also be subject to abuse from rival producers. Thus for those without the means to take out a patent, trade secrecy would have been to their distinct advantage.

The patents indicate a demand for particular objects such as chimneypieces and picture frames, or at least, applied ornament for their decoration where the repetitive vocabulary of neoclassicism would have been employed at this time. As regards the chimneypiece, there might at first seem good reason not to use compo in a situation where ornaments might be exposed to heat. However, a number of patents indicate the use of similar oil based recipes for fire proofing. Little London based evidence for the use of compo on chimneypieces survives and there is usually insufficient information to assign a firm date. However examples may still exist in the city of York, which, although affected by the growth of Leeds, became a centre for local gentry (**Fig. 7**).[10]

Westwood's specification is of further interest, in that it post-dates the earliest London trade directory entries for compo makers/manufacturers by a couple of years. It may be significant that Westwood was based in Birmingham and drew inspiration from and responded to demand generated by Wedgwood and Boulton for cast ornament. It is clear that the quest for the ideal casting material for ornament was still unresolved at this point and that it was still worth protecting formulations with a patent.

The next noteworthy recipe is that of Peter Nicholson from *The New Practical Builder and Workman's Companion* (1823) [32, p. 382]. It is worth quoting the extract under the title "Composition" in full, as the description is clearly recognisable as the compo of today, despite the exclusion this time of rosin.[11]

Besides the composition, before adverted to, for covering the outsides of buildings, plasters use a finer species of composition for inside ornamental works. The material alluded to is of a brownish colour,

[10] No. 31 Stonegate, York, is said to have been occupied by John Staveley around the turn of the eighteenth century. Here, a shop front and first floor front room enriched with applied ornament (potentially compo, though it has yet to be tested) are attributed to John Staveley (free 1776) and partner William Staveley (free 1781). Much of the applied ornament in several houses in York is also attributed to the Wolstenholme family of carvers and gilders [30 & 31].

[11] For a discussion of the effect this had on a formula, see Appendix V.

exceedingly compact, and, when completely dry, very strong. It is composed of powdered whitening, glue in solution, and linseed-oil; the proportions of which are, to two pounds of whitening one pound of glue, and half a pound of oil. These are placed in a copper and heated being stirred with a spatula till the whole becomes incorporated. It is then suffered to cool and settle; after which it is taken and laid upon a stone, covered with powdered whitening, and beaten till it becomes of a tough and firm consistence. It is then put by for use, and covered with wetted cloths to keep it fresh.

The context of this recipe is worth considering because it comes from the "trade manual" for architectural purposes which was fairly common in the eighteenth century. Actual recipes, however, seem to have been less commonly provided in these earlier manuals and, when included, were usually for external cements such as rendering and mortar. The absence of recipes in these eighteenth century sources again suggests a certain secrecy surrounding formulations, also corroborated by the way in which compo is advertised in trade cards of the 1780s.[12] However, towards the late eighteenth and early nineteenth century, practical manuals begin to appear which contain useful recipes on a wide range of subjects, partly aimed at the amateur working within a domestic environment.

Even with this increased openness, Nicholson is the exception rather than the rule. The fact that there is a significant period of time between the Westwood patent and the Nicholson recipe implies that a "standard" four ingredient recipe was something that took some time to become widely established within the trade.[13] The exclusion of rosin from the recipe adds further weight to this rationale. Even following Nicholson's formula, there remain relatively few surviving recipes for compo. Either trade secrecy within firms continued to prevail in spite of the continued development and improvement of rival materials, or the novelty value in compo had simply diminished with rival developments (though production levels had not necessarily diminished). In addition, amateur interest at this stage may simply have been too weak for many published recipes.

Towards the middle of the nineteenth century, there are a number of attempts at adding caoutchouc or India rubber to recipes with the intention of improving it.[14]

[12] See Chapter Six.
[13] Observations made on picture frames that are thought to date from the 1810s also appear to support this deduction. See Appendix V.
[14] See also Appendix II.

Thomas Spencer, a carver and gilder from Liverpool took out a patent (1841) for a variety of significant procedures, one of which was the addition of caoutchouc to composition for "improving the texture of composition used to cast ornaments for picture and other frames and cornices, and applicable to other decorative purposes", which "for these purposes is usually made of definite proportions of melted glue and water with whiting and resin or pitch in the melted state".[15] It was thought that this relatively recent import would "give the whole composition additional elasticity and tenuity, and prevent cracking" but whether this was actually true must await a detailed scientific study. What is clear, is that the traditional four-ingredient recipe was considered to have serious shortcomings as regards its durability. In addition, the four-ingredient compo was a common material in the carving and gilding trade on a nation-wide basis by this time.

By the 1870s, compo in its traditional form had now been established for many decades. It is probably for this reason that recipes such as that of C..H. Savory (1874) are not quite so scarce, the secrecy surrounding the ingredients not being of such importance now that the novelty value of the material itself had long worn off [33, p. 35]. That is not to say that individual recipes and variations were not still closely guarded by those in the trade. Composition making, like bread making was, by its very nature, a trade that relied on the virtues of its recipes. Savory's practical handbook is from the tradition of such manuals common in this century but is quite specific to the trade, hence the inclusion of a compo recipe:

Receipt for Compo

Boil seven pounds of the best glue in seven half-pints of water; melt three pounds of white resin in three pints of raw linseed oil. When the ingredients are well boiled, put them into a large vessel and simmer them for half an hour, stirring it, and taking care it does not boil over. When this is done, pour the mixture into a large quantity of whiting, (previously sifted and rolled very fine), and mix it to the consistence of dough, and it is ready for moulding into the required shapes. The above compo will keep for a long time in a damp place, or in a barrel of whitening.

Around the turn of the century, a number of further recipes can be found, each with the familiar ingredients and often from a specialist manual of recipes, aimed at the amateur and professional maker, such as the "picture-moulding composition" of E. &

[15] See Appendix II.

F.N. Spon [34, p. 376].[16] This indicates that the making of compo had by now become of interest as one of a host of recipes and procedures at an amateur level and not solely on a commercial scale by professional craftsmen. The account of mixing is worth quoting in full as it provides some idea of the skills needed to make the compo, as distinct from those required to mount the ornaments on the object. Tests indicate that speed of working and the ability to judge with some accuracy when the "dough" can be kneaded in the hands and for how long before it must be subject to the mould and the press, are perhaps the most important factors.[17] Undoubtedly these come with practice in a very similar way to bread or pastry making. Equally the experienced craftsman (as has been suggested) may have estimated the quantities of all ingredients and not merely the whiting.

1 lb of glue melted (by heat) in water sufficient to make a thin glue.
½ lb of pale resin melted into
½ lb pint raw linseed oil
Whiting

Mixing

The principal ingredients are glue, water, linseed oil, rosin and whiting, which are combined in such proportions as to make a mixture soft enough for working while, at the same time, it should be so tough as not to crack, and should harden in a few hours if the ornament be thin or in a day or two if it be more massive. The state in which it used by the ornament maker is that of a stiff dough; and the making of it resembles the process by which the baker makes his dough. The proper amount of glue is steeped in water, which is heated to dissolve the glue; while the oil and rosin are melted in a separate vessel containing the melted glue. The whiting is pounded and placed in a tub or pan - being previously warmed if the weather be damp and cold - and the hot melted glue, oil and rosin are poured upon the whiting, and then well mixed up with it, and kneaded, rolled, and beaten until it becomes a smooth, tough, elastic kind of dough or putty. It may then either be used at once, or may be laid aside for future use, but, whenever it is used, it must be warmed, either before a fire or by admitting steam to act upon it, because, when cold, it is too hard and stiff for use.

Millar's recipes (1927) for "London Composition" and a "Composition for Picture and Mirror Frames" comes from *Plastering-Plain and Decorative*, [36, pp. 294-5] published in four editions from 1897, and a fairly familiar but useful text for

[16] The recipe of Frederick Scott-Mitchell (1915) is a further example [35].
[17] See Appendix V.

descriptions of different types of related materials and techniques. Its accuracy does seem questionable on occasion, however there seems no reason to doubt the authenticity of the recipes as they both form a very satisfactory compo.[18]

(Said to be an old recipe used in most London shops)

16 lb town glue dissolved in 5 pints water
9 lb of resin
3 $^{1}/_{2}$ pints of linseed oil
Enough sifted whiting for the consistency of thin dough

Millar also distinguishes between this compo and the "Composition for Picture and Mirror Frames". However, having made up the recipes, their behaviour proves to be very similar. The picture frame compo is slightly more pliable and therefore easier to work in the hands than the London variety, probably due to the pitch and sugar.

7 lb best scotch glue dissolved in 2 $^{1}/_{2}$ pints water
5 gills linseed oil
3 $^{1}/_{2}$ lb resin
$^{1}/_{4}$ lb pitch
Enough sifted whiting to make stiff but pliable dough
3 oz coarse sugar dissolved in water to each pound of glue, can be added to recipes 1 and 2 to render them more pliable and help to blend in oil.
Glue for fixing is improved with 1$^{1}/_{2}$ oz sugar and 1 oz linseed oil to each pound of glue.

Essentially though, if London composition was a recipe commonly used in that city, it must have been employed for picture frames (and to a far lesser extent, mirror frames) as these objects represented the main channel for the use of compo ornament at the turn of the century. The other recipe must therefore be a further example. It is not a softer version of compo that is sometimes mentioned for use with machines.[19]

Most of the ingredients mentioned here would have been available within the standard workshop even in the late eighteenth century.[20] A screw press was all the specialist

[18] See Appendix V.
[19] The composition used for this procedure was said to be a softer paste compared to the dough-like consistency of compo for general use in the screw press.
[20] See Glossary.

equipment required and the moulds themselves of course. Thus with the exception of the moulds, outlay for compo manufacture was minimal.

These later nineteenth and early twentieth century recipes from trade manuals (although differing from one another to a greater or lesser extent in terms of the relative proportions of their ingredients, and the occasional addition of other minor ingredients) do not seem to exhibit a specific change, modification or development over time. This indicates that the four ingredient recipe, though presenting variations according to the particular source from which it came (or was derived), had long been established by this time. Indeed, the very fact that such recipes were published at all in such sources suggests a lifting of secrecy by those in the trade, who were usually responsible for producing the manuals. On the other hand, it is unlikely that large manufactories such as Jackson's would have disclosed their recipes at any point, even if compo production formed only a small part of their output by the end of the nineteenth century.[21] The use of these recipes as marketing devices would have been more or less limited to the "scientific amateurs" at whom they were aimed. The context of the manuals is not really retail orientated and the availability of a recipe is in direct contrast to the marketing opportunity to be gained from its secrecy (as Chapter Six demonstrates), hence the reason for the continued secrecy within those firms who still produced compo.

Tests show that although recipes vary quite considerably in the relative proportions of their ingredients, they all make satisfactory compo, indeed the first patent formula of Westwood has some of the best handling and casting qualities. Therefore it cannot be said that one is an improvement on the other.[22] Although the four-ingredient formula may still not have been widely established by the 1820s, four particular ingredients did become the common denominator. The tests show that there was a wide margin for error in most recipes, even to the point of omitting one major ingredient altogether. This means that recipes would require the addition of a different ingredient rather than a change in their proportions to constitute a development that could be called a real improvement. This is one of the reasons why tests were

[21] Jackson's still guard the secret of their recipe.
[22] Unless it could be proved that certain recipes age better than others, a point which, as stated from the outset, is outside the boundaries of this thesis.

performed varying the proportions of the ingredients to such a large extent. Therefore all recipes were in a constant state of change, and no standard recipe could be said to have been firmly established, but four-ingredient formulae became commonly used.

The broader development of other materials for cast, applied ornament, (for frames but predominantly for architectural decoration) throughout the nineteenth century, and the evidence of machine-made objects (**Fig. 8**), indicate that the four-ingredient formula, far from still being the subject of improvements, may even have been little used by the end of the nineteenth century. The interests of manufacturers had also shifted to techniques of production, discussed shortly.

2. Moulds and the Casting Process

"A history of compo is partly a history of the moulds used to produce it" [22, p. 113]. At this point developments in mould-making will be considered and this section will also deal with other aspects of the process of making and applying ornament as they relate to compo.

During the period with which this thesis is concerned, there have been periods of experimentation in mould-making and a variety of materials have been employed. Evidence of this experimentation does coincide with periods of increased demand for applied decoration (particularly at the end of the 1830s and early 1840s), although this demand was certainly not exclusively for compo. Therefore many of the moulds were used for materials such as papier mâché and carton pierre. Specific moulds were required for use with machinery (usually circular or segmental), though the technology was already in place by the time they were required, as the following sections will reveal. Although not of primary importance, moulds were made from metals such as brass, copper, iron and pewter (**Fig. 9** & **10**). Metal moulds are discussed later in this section. Sulphur was also employed but provided moulds that were extremely brittle. These were reserved for small runs or for more infrequent use where it was merely necessary to take an impression or "squeeze" from an existing design element or "positive" (**Fig. 11**).[23]

[23] For conflicting opinions see Millar [36, p. 295], and Spon [34, p. 277]. The latter suggests that "The moulds are usually made of boxwood…".

Wooden moulds

The ornaments to be cast in this composition are modelled in clay, as for common plastering, and afterwards carved in a block of box-wood. The carving must be done with great neatness and truth, as on it depends the exquisiteness of the ornament [32, p. 382].[24]

Moulds made from close-grained hardwoods (mainly box), have always been favoured over metal and sulphur for their durability and relative light weight. It has been assumed that other woods were commonly used for creating composition moulds and that this practice was subject to availability within the carver's workshop, for example certain sources mention pear [37, p. 204]. Woods other than box were often used for moulds of larger dimension where a large piece of boxwood was not available. These woods are usually of the type that will produce an accurate carving with relative ease, but hard enough that the fine detail of the pattern could withstand years of use as a mould; for example cherry.[25]

As the wooden moulds were carved in reverse, they required highly skilled carvers and in the late eighteenth century they were still in abundance. However, as compo became more widely used, it brought radical changes to the British carving industry; by 1819, compo was said to be 80 percent cheaper than carving [38, p. 556]. Whether the services of a skilled carver were readily employed at this time is questionable, as Thomas Martin remarked as early as 1813:

There are only eleven master carvers in London, and about sixty journeymen (though at one time there were six hundred), many of the latter are now very old... Of about 150 persons, who call themselves carvers and gilders, the greatest number are gilders only ... [many] never saw a carving tool in their lives [39, pp. 211 & 213].

Clearly, the compo industry was in full swing in the early years of the nineteenth century and this quotation holds further implications for the organisation of production. However, compo or the idea of compo is not presented here in the most

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24 It has been suggested that they may also have cast reverse moulds from a positive and used these as a guide for work. Personal communication, Gerry Alabone, Frames Conservator, Guildhall Art Gallery.
25 Occasionally moulds of a lesser quality and from less suitable woods such as beach have been noted which probably indicates their high cost and the need to economise (perhaps in a small workshop which did not employ a dedicated intaglio carver).

favourable light compared to carving. This indicates that the skills of compo makers were regarded, at least by those associated with the trade, as a poor substitute for those of woodcarvers at this relatively early date.

An extract from the autobiography of the wood carver Thomas Wilkinson Wallis (mid nineteenth century) gives a brief but illuminating insight into intaglio carving practices around the mid nineteenth century, under the section entitled "Carving moulds or die-sinking":

> This mould – or die-sinking, is very good practice. You have to realise the forms you want; then, in carving, to reverse everything; to keep the sides slightly sloping, so that the casting of composition leaves the mould freely, and the whole has to be worked clean sharp, and true [40, p. 57].[26]

Other sources, outside the trade, though not strictly from the perspective of the consumer, provide further details:

> The design, whatever it may be – a scroll, a leaf, or an escutcheon – is first sketched upon the wood with pencil. The outline is cut round with a chisel and mallet, then the wood within the line is scooped out with chisels of various shapes until the die is of the required depth, and then (for example) the figured surface of a leaf maybe, is carefully fashioned in the bed as in the concavity of a seal. ...
>
> The moulds from which these castings are made are among the most expensive implements used in the business, every little scroll and ornament requiring a separate block [37, p. 204].[27]

As the carver removed the wood, he would periodically check his work by pressing the design into a tray of silver sand.

Before considering other types of mould, it is worth mentioning the screw hole to the centre-bottom of many examples. This feature, according to Pinto, is characteristic of composition moulds as opposed to those intended for culinary use. One suggestion is that a larger support block would have been secured to the mould when in use to withstand the pressure in the press. This was removed when not needed to save on

[26] The significance of this statement in terms of trade structure is considered in Chapter Three and cost is discussed in Chapter Five.

[27] Mayhew, as editor of this volume, clearly had a vested interest in the favourable presentation to the consumer of the trades with which it is concerned. However, there seems no reason to doubt that this particular extract contains a fairly accurate account of mould-making.

storage space [41, pp. 183-5]. Carton pierre could also be used with this type of mould.

Metal Moulds

The wooden moulds produced a cast from the initial reverse carving, which ensured optimum quality. The metal moulds on the other hand were themselves produced from a "positive" and thus the resulting pressing or "pull" was at least one more casting stage away from the original detail; a copy of a copy. If that positive were itself first cast from a mould, the resulting cast would be two stages away from the original and detail would be further compromised, no matter how fine the pattern of the original. Thus their production required a number of stages but once made, they were of course extremely durable. It is therefore surprising that so few seem to have survived and were probably victims of wartime metal drives, often unnecessarily.

The 1841 patent of Thomas Spencer, a carver and gilder from Liverpool, is of interest in providing a guide to the development of metal moulds:

> ... from which may be cast ornament in the material usually termed by carvers and gilders composition, and in the material termed papier maché; suitable also for casting glass, earthenware, and china.[28]

The basic process was one of electroplating, which involved depositing a copper coating on a non-metallic cast (a positive).

The specification also suggest that these techniques were known in the carving/gilding and related trades at this point. Spencer recommends a period of "four, five or six days" in the apparatus to allow a sufficiently thick layer to accumulate on the cast: "one eighth of an inch" is recommended. As the cast was sitting on a flat surface (glass is recommended) in the apparatus, the rim is perfectly flat. The patent then specifies that the back of the cast be tinned before the back can be filled with another metal, (when the tin is molten) forming a *level block* "as when in use they are submitted to the action of a press". The types of metals used to "back up" this cast are cited and:

[28] See Appendix II.

> For most purposes lead will be found sufficient, but in some instances, where the pressure is but slight, it will be sufficient to give the back a coating of any hard cement or even plaster of Paris, and close the whole up in a wooden box, leaving the face surface of the mould only exposed. But in all cases where molten glass has to be pressed into these mould, it then becomes necessary to use a metal for the outside coating that is not easily fusible, such as brass or iron; these are to be fastened to the deposited copper mould by the process of brazing.[29]

This patent is of further importance for the relevance of these moulds to other purposes. For example, "Moulds for casting glass may be made in one or more pieces as may be consistent with the design". This indicates that compo was not one of those materials commonly cast to create undercuts and that materials that were liquid when molten, such as glass, could be cast in this way. The context here is significant because it implies that a set of moulds and their accompanying techniques within the carver and gilder's workshop could extend beyond the confines of composition ornament production.

The importance of flat surfaces for wooden moulds and the metal moulds described in Spencer's patent has been mentioned. However, many metal moulds noted within Jackson's collection do not have a flat top (and bottom) face (**Fig. 12**). This means that they could not be subject to even pressure across the surface in a press. Compo, on the other hand, is a relatively stiff dough when in a flexible state and this means that it requires pressure to force it into all the cavities of a mould (of any complexity and size).[30] Therefore, those metal moulds with an uneven face or top edge were not intended for use with compo. These were for carton pierre which was a much softer dough in its pliable state. A cast was taken by pressing carton pierre into these moulds with the fingers. The resulting carton pierre casts may not have been as fine as those of compo, however they were used extensively for architectural mouldings such as ceilings where they were not subject to the more intense scrutiny of objects such as furniture and frames (**Fig. 14**).[31] The development of such moulds therefore

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[29] See Appendix II.

[30] In restoration, a screw press is not always used, and small replacement sections are often cast with a two-part, flexible resin, which can be supported on a small strip of wood for added pressure. Very small pieces of compo can be rendered flexible enough for casting in this manner but the dough is too stiff in any quantity, hence the need for a screw press with large rigid moulds.

[31] Personal communication, Tony Howells, Morris Rugg, and Ron Wood (since retired) of Jackson's, 1999.

closely follows the introduction of carton pierre in the 1830s [42].

In line with Spencer's patent, there are metal moulds that have a flat surface and these have been mounted in a level block, either of metal, plaster of Paris or wood. In this context, plaster is very much a substitute material making a far less durable compromise when subject to pressure. Some of these metal moulds were therefore, clearly made with compo in mind and some of them may have been adapted.[32]

Gelatine

Gelatine moulds have occasionally been referred to in connection with composition ornament production, although no printed reference has been found of such a connection. To shed light on any confusion, gelatine could not be used for casting compo for a couple of reasons. First, the heat of the pliable putty would cause the surface of the gelatine to melt.[33] Second, compo, is a fairly stiff dough and therefore cannot be forced into all the details of a mould without screw pressure let alone a mould as flexible as gelatine.[34] At the very least, distortion of the mould would occur and it would simply collapse in a press. Again, this indicates that gelatine was connected with the use of the softer carton pierre which could be pressed in with the fingers (the softer consistency and lack of heat causing no distortion to the mould).[35] It is thus no surprise that Jackson's, who used carton pierre so extensively, particularly in the second half of the nineteenth century and the early part of the twentieth century, devoted an entire workshop to the procedure (**Fig. 15**). The advantage of a flexible mould meant of course that undercuts were possible, and this 1840s technology, which runs parallel to the development of carton pierre, must therefore have represented a significant technological and economic threat to the use of compo for general architectural purposes.[36]

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[32] If the surface (or decorative edges) of these moulds were not extremely uneven, it might still be possible to use them in a press with successful results. Therefore the distinction made here may not be quite as great in practice as it appears.

[33] This was also true for plaster of Paris whose setting process generated a certain amount of heat (see extended Glossary.

[34] See Appendix V.

[35] Personal communication, Morris Rugg, Tony Howells, and Ron Wood of Jackson's. However this is an area for further research.

[36] See extended Glossary for a brief description, history and examples of the architectural uses of carton pierre.

Piece Moulds

On the subject of undercuts, it is worth briefly considering a further kind of mould, the piece mould. However, the true piece mould was not commonly used for compo, again due to its relatively stiff consistency.

The use of piece moulds, which permit the creation of casts with undercuts, can be traced back at least to the fourteenth century and was therefore nothing new [43, p. 4].[37] These moulds have to be constructed so that the various pieces fit together accurately and can be removed from the undercut areas after casting. Therefore they were made with tightly interlocking edges that would make up all the details of the mould on the inside and provide a relatively smooth surface on the outside, enabling the complete mould to fit into a case or support, usually of plaster or wood.[38] As far as compo is concerned, the key consideration is, once again, whether sufficient pressure can be applied to force the stiff dough into the details of the mould. The piece mould must both allow for two flat surfaces to be placed in a screw press, with a space for the excess material to escape (the excess is built up on the back of flat compo moulds and removed with a knife) as the mould is pressed. The brass piece mould in **Fig. 12** for a flower swag decoration would not meet these requirements because it has an uneven metal edge that stands proud of its supporting block. It was no doubt intended for use with carton pierre since this could be pressed by hand into the gap in the top, left when all the pieces are assembled in the mould.[39]

Fig. 13, again mounted in a wooden support block has a much flatter surface and it is possible to use this mould in a press. The flower swags for these undercut moulds were not completely in the round; their sides were moulded but their backs where the excess moulding material was squeezed out, remained plain. Other moulds such as the decoration around candle drip trays for a girondole (**Fig. 16**) were cast in the round, making it difficult to cast in compo. If this type of cast were to be produced in compo, a different type of mould would be necessary. After pressing the above moulds, they can be tipped out of their support block and the pieces can be carefully picked off the pressing. Jackson's have a number of such examples, some comprising

[37] Michelangelo is said to have been the first to develop "piece moulding" technology.
[38] Clearly plaster piece-moulds were also used with carton pierre, noted in Figure 15.

up to thirty pieces and more. However they are absent from the average compo maker's workshop.[40]

Many ornaments in compo that have some element of three-dimensionality are usually constructed in a rather different way. The various component parts of the design, such as the "St. George and the Dragon" mould (**Fig. 17**) were carved into one or more blocks and the parts assembled when cast. This often involved two halves of a design such as an urn or animal, which could then be stuck together. The beauty of compo was that elements like flowers could be created by casting flat designs and bending them into shape while still flexible.

Methods of Casting

The standard method of casting compo ornament in boxwood moulds is succinctly described again by Nicholson:

> The composition is cut with a knife into pieces, and then closely pressed by hand into every part of the mould; it is then placed in a press, worked by an iron screw, by which the composition is forced into every part of the sculpture. After being taken out of the press, by giving it a tap upside down, it comes easily out of the mould. One foot in length is as much as is usually cast at a time; and when this is first taken out of the mould, all the superfluous composition is removed by cutting it off with a knife; the waste pieces being thrown into a copper to assist in making a fresh supply of composition [32, p.382].

The process is again described by Spon in his early twentieth century manual, indicating very little change to the procedure in nearly a century.

> Casting
>
> These, (the moulds) are brushed over with oil before the composition is pressed in, the pressing being done in a screw press, a wet board being put over the composition in the mould so that the ornament can be withdrawn stuck to the board. The ornament is not allowed to harden in the mould; it is simply pressed in, then withdrawn and removed from the board with a large knife. It is then put aside to harden. A good pressure should be employed on the composition in the mould, that a solid well

[39] For a good description of the casting process using piece moulds with carton pierre, see Mayhew [37, p. 204].

[40] The beautiful (private) collection of which Figure 17 is an example, does not include any true piece moulds, perhaps because the business in question seems to have worked almost exclusively with compo.

defined object may result [34, p. 376].

Although care is needed to ensure all the cavities of the mould are well coated with linseed oil (as a release agent) without flooding them, this process is relatively straightforward, provided the worker estimates the correct quantity of compo for the particular design. It is also important to ensure the surface of the piece of compo to be pressed is smooth and wrinkle free. Therefore it is ready at the point at which it has been kneaded sufficiently but is still warm and pliable enough to be pressed successfully. Again, to achieve this with the speed and efficiency required of the commercial workshop would be a matter of judgement and practice, although an apprentice might acquire such skills in a matter of weeks or months (**Fig. 18**). Commercially, the compo maker would not prepare merely enough compo to be pressed in one or two moulds. Large "loaves" were made up and pieces re-heated and used when required.

The Application of Ornament

This composition, when formed into ornaments, is fixed upon wooden or other ground, by a solution of heated glue, white-lead, & c. It is afterwards painted or gilded, to suit the taste and style of the work for which it is intended [32, p. 382].

Scott-Mitchell also provides instructions for applying the cast ornaments to the substrate:

It is strongly adhesive and so pliant that even after being allowed to harden it may be curved into any shape necessary...simply by steaming the cast for a few minutes and applying it to its position with an adhesive coating of strong glue [44, pp. 31-33].

Brads were employed with the heavier sections of ornament and lengths of often fairly substantial wire were usually laid onto the backs of the casts (out of the moulds) when set and the wire backed up with further soft compo using the fingers.[41] Sometimes the wire has clearly been pushed through pressings when they are still flexible, and where it has been easy to do so. However as compo quickly becomes a tough plastic it is

necessary to insert the wires rapidly, and it is usually too tough to pass them through material of any length or curvature, unless very fine, hence the first method. In addition, Scott-Mitchell points out that: "It may also be 'wired' through in the casting to strengthen its application in the form of loose swags, or festoons, and of partly detached ornament as in Florentine frames mirror frames, etc." [44, pp. 31-33].

Ornaments were produced and sold ready-made or "soft from the press", even at the beginning of the nineteenth century [39, pp. 211 & 213].[42] The production of twelve foot lengths of moulding are mentioned, indicating that one foot bands of compo ornament were glued to long lengths of usually softwood mouldings of various designs. At least twelve casts would be required to make a length, if not more, to accommodate the pattern match.[43] On the other hand, "soft from the press" implies that the compo ornaments themselves were sold while still in a flexible state so that they could be used to decorate the wooden framework of the object at the particular tradesman's discretion. This indicates that both products were being supplied.

There is clear evidence from the objects themselves that bands of compo ornament were being supplied already attached to wooden mouldings because the pattern does not always match at mitres. Had soft compo decoration been applied to the completed frame, or the lengths cut to match at the mitres, it would have required little extra time or effort but would have necessitated a certain amount of wastage. This of course is one of the major advantages of compo over many other materials. It was flexible enough in a gelled state to be stretched without cracking or too much distortion of detail. The wood carver, on the other hand, was obliged to create lengths of repeat ornament that were either slightly compressed or elongated to fit joins exactly.[44] It is often recorded that compo was wrapped to retain its moisture or "covered with wetted cloths to keep it fresh" (1823), justifying its supply in the flexible state [32, p. 382].[45]

[41] This is where the fingerprints of the maker can sometimes be observed. Of course in this instance it was not crucial that this compo was perfect and wrinkle free as it would not be seen.
[42] See also Chapter Three.
[43] See diagnostic features below.
[44] These were called "stretchers" and "shrinkers".
[45] By 1920, firms such as Tynecastle Company of Edinburgh, were supplying compo in "a flexible state" by mail order.

"The mounting of these ornaments oftentimes requires skill and practice, as they have to be placed on a large proportion of the gilded articles sold in the trade" [33, p. 36]. A couple of designs from Jackson's first known catalogue (1836) help to demonstrate the nature of these skills in the production of compo objects such as the girondole in **Fig. 19**. Many of the branches and loose ribbons, fronds and flowers would have metal armatures cast within their decorations. With very fine sections, this was clearly quite tricky. The additional leaves and fronds could then be applied, either when the basic compo elements were dry or still slightly pliable. The various elements such as the scrolls were undoubtedly made up from designs like that in **Fig. 20**, which could then be bent into the required curve while the compo was still flexible under the craftsman's judgement. There was undoubtedly a certain amount of artistic licence in interpreting a design but clearly many were "set pieces". Catalogues like that those of Jackson at this time would have been available to customers outside the trade who might expect to receive exactly what was illustrated. Further evidence of this strict adherence to a compo design is noted later in the century.[46] Again, elements such as the drip trays for the candles would have been pressed from a flower like mould and the individual "petals" would have been folded upwards and then out forming the "flower" in a similar way to cake decoration. For example, the frame for Charles Allston Collins' *Convent Thoughts*, designed by Sir John Everett Millais in 1851 (**Fig. 21**).[47] This frame "which, I expect, will be acknowledged to be the best frame in England", employs compo lilies and leaves, moulded with great care by hand, first having been cast using individual moulds made specifically for the task.[48] However, such examples represent a departure from the general compo frame output during the 1850s. Thus, although it could not be said that the compo maker required the modelling skills of a mid-eighteenth century ceiling plasterer, these designs did involve a certain degree of artistic judgement in their interpretation. This is emphasised by the following description (c.1865) of the process within the workshop of the looking-glass and frame manufactory of Charles Nosotti, and is worth quoting at some length to this end:

[46] See Figures 85 & 87.
[47] Oxford, Ashmolean Museum.
[48] Personal communication, John Anderson, senior frame conservator, Tate Britain. See also: Millais [45] also quoted in Simon [1, p. 104].

... the frames with which we are most familiar are a combination of deal, wire, composition, paper, and gold leaf. Imagine a frame stripped of all its scroll work and ornaments; it is simply a deal frame, put together in pieces which have been previously cut and grooved. The next process is to cover the wood with a coating of whiting mixed with size. After several coats of this preparation have been applied, in order to render the surface of the wood smooth, the frame is handed over to the modeller. This artist sometimes designs as he goes on; but in work which you see round the frame is fixed upon thick iron wire, which is inserted through the wood, and bent outwards or inwards according to the design. On the bench before the workman you observe, in detached pieces, leaves of all kinds, as well as berries, scrolls, shields, and other fancy devices, cast in a brownish-looking plaster. The artist takes up these pieces singly, and fixes them with glue upon the wood and wire. He has a pot of hot water beside him, by dipping his fingers in which he keeps the plaster-casts soft and pliable. Some of the first pieces of plaster put on the wood extend the whole length of the frame, just as you put a strip of dough round a pudding-dish. Then the smaller ornaments are fixed upon the surface, or attached to the projecting wires. Not only great skill and care are required in performing this operation but also great artistic taste; for the workman has to fill up the design as he proceeds, blending, as it were, all the smaller pieces into one complete picture [37, p. 204].

Mechanisation

The introduction of machinery into the production process for composition ornament, principally in the second half of the nineteenth century, is relevant for the following stages of production: kneading the "dough"; the pressing process, involving the batch production of long lengths of cast ornament (on or off the wooden substrate); the coatings/finishes and there is evidence for the use of mechanical devices in the production of the moulds themselves. As coatings or finishes are a subject of great complexity in their own right, this thesis does not consider this subject in depth.

As no machines (at least in Britain) appear to have survived, evidence for these processes exists primarily within patent specifications of which the most information exists for pressing methods. As regards these methods, it is possible to gain an idea of the development of various mechanisms at particular dates in this country from the number of such machines that were patented.[49] Whether or not these machines were so successful as to be widely used is still a matter of conjecture. It is important however to consider whether they were mainly designed for the production of specific objects like frames, or whether their aim was merely to produce cast ornament for

[49] Whether such development was more advanced in other countries is a matter for further research. However, such research is necessary to determine the extent to which Britain were innovators in this field.

general use. Naturally, date is important in pinpointing the development of a possible "streamlining" process from a wider to a narrow use of compo.

The pressing methods generally fall into two basic categories, reciprocating and roller. Many of them are quite specific in their use but a couple of early examples from around the middle of the century demonstrate that "apparatus and machinery for giving shape and configuration to plastic substances" such as Charles Hancock's specification of 1848, was in place at this time.[50] Although this machine could not produce the compo ornament, ready applied to the wooden mouldings, it did cut out the kneading process using a bed filled with hot water or steam to keep the "dough" pliable.[51] It is clear that the materials intended to be used with this machine, if not compo, had similar working properties to compo. The second part of this invention was a machine for creating "hollow wares" through the pressing or reciprocal action of a male and female mould. For example small stationary boxes and trays, often seen in papier mâché but rarely compo due to the absence of fibres that provide structural strength. Whether this machine really represented greater efficiency than the traditional screw press is in doubt. It may be that the moulds could be refilled mechanically, to maintain a steady flow of production, but this is not clear from the specification. The 1850 patent of John Hunt, an engineer, is similar but also provided a machine for "cutting moulds in metal or other hard substances in which any suitable plastic substance can be pressed." However such technology was not new at this time.[52]

Although no evidence has been found for the use of the hydraulic press within the workshop in living memory, it was used in the mid nineteenth century for pressing small objects that could be moulded in their entirety such as trays (specification no.117, F.D. Blythe, 1855) **Fig. 22**.[53] Vacuum presses were also used, again for

[50] See Appendix II.
[51] The material could then be extruded through a die (perhaps with wires or cables that required protection, in the same way that gutta purcha encased telegraph wires in the 1860s).
[52] The specification of William Irving, no. 10,517 (1845), Appendix II.
[53] See Appendix II. The hydraulic press was and is still used for the production of composition at the Directors Supply Corporation, Chicago, probably in conjunction with wooden moulds. Correspondence from Graham Reynolds Ltd., Gilders and Picture Framers, East Brisbane, Australia to Tony Howells at Jackson's. The company appears to date at least from the 1930s as its catalogue has not been updated from this time. Poor quality copies of the workshop interior seem to indicate that

pressing out pulp of assorted ingredients.[54] The intense pressure is not so easily regulated and runs the risk of cracking the individual wooden moulds. Therefore manual methods of production survived in association with the screw press and as all forms of pressure perform exactly the same operation, the advantage over the screw press was speed if long runs of ornament were required. The use of steam to power machinery is noted at least as early as 1861, when the carver and gilder Thomas Whetstone was advertising the production of goods "by steam machinery".[55] These goods may well have been picture frames.

Despite these earlier examples, no real evidence of machines specifically for picture frames has been located until 1866 with the specification of R. Gesell and A. Lea (no.1407). This machine produced flutes in "a preparation" that was previously applied to wooden mouldings (**Fig. 23**) and so it was not really substituting one of the manual processes involved in making a compo enriched moulding. It is almost certain that the flutes described were those in the scotia or cavetto mouldings of neo-classical revival frames, first popular in Second Empire France in the 1850s and then in England in the 1860s. This frame type was well suited to a range of subject matter, ensuring its popularity and survival to the present day. To make such a frame profile manually was a time consuming and precision task. The flutes are created in gesso as it dries using a fluted convex die that is pressed into the gesso coated scotia or cavetto (in a similar way to a plasterer "running" a length of coving, though perpendicular to it).[56] This task, together with the popularity of the frame justifies the development of a specialist machine. However this also implies that mouldings whose flutes were produced in the wood by machine were comparatively expensive, if indeed they were readily available. This machine was therefore a highly specialised, labour and money saving response to the growing demand for frames and it is no surprise to find that it was developed within the trade and not by speculative outsiders, many of whom were engineers.

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wooden moulds were used. Jackson's still employ the screw press for composition moulds, and the hydraulic press, though widely used in many industries, was said not to have been used within the firm.

[54] See specifications 3735, Howard, F.B., 1889 and no. 12,410, Johnson, J.Y., 1888, both taken from Abridgement Class Mouldings &c., British Library. See also Appendix II.

[55] See Appendix I.

Gesell and Lea advertised as carvers and gilders in 1866 but by 1868 they were also described as "gilt moulding manufacturers" in the first appearance of that category in London directories.[57] This seems to mark the beginning of a major burst of activity in the invention and use of machinery for the ornamentation of picture frames. The advertising itself does not necessarily indicate a surge in demand for frames, indeed, the reverse could be true, but its concurrence with the patent machinery provides far more convincing evidence. The basic technology to cater for such a demand existed before 1866, but the technical literature suggests that it was not channelled into the specific production of frames. This indicates the extent to which demand for mass-produced frames was fuelling the development of such machines. Of course the machine was probably operational within the workshop for some time before the patent was granted.

Another factor, which may have some bearing on developments, is that the names of many of those who advertised themselves as "gilt moulding manufacturers" are of German/Jewish extraction. The large influx of immigrants into London in the 1850s and 1860s also provided impetus for the development of new enterprises and it is likely that they brought with them machine technology in the field of picture frames. Evidence from Germany itself indicates that such machinery was not uncommon (**Fig. 24**).

In 1868, a relatively basic milling machine which employed the use of a circular metal die or roller for the production of picture frames, was patented by H. C. Clifton (Specification no. 3130) **Fig. 25**. Though simple in design, this model contained a number of accessories to perform a series of important tasks not mentioned in other specifications. These included a reservoir Q to deposit oil on the roller and prevent it sticking to the "composition", and a brush S to sweep away excess particles of composition from the roller. This roller carried a bracket to which a blade could be attached to strip the length of ornament off the bed. Additionally, other blades could be attached to trim the edges and cut the length into strips, if the die contained a series of patterns. The machine could be hand cranked or the bed could be "caused to travel

[56] John Anderson was required to recreated such a frame within the frame conservation department of the Tate Gallery, during which time he rediscovered the original manual techniques. Personal communication, John Anderson.

beneath the engraved roller" by means of "steam or other power".[58] Although it is not known whether this machine was made for the four ingredient compo formula, it is clear that it was intended for a plastic material which behaved in a very similar way to compo.

The Clifton model is the first patent to mechanise all the requirements for pressing a continuous strip of compo (or other plastic material). Nevertheless, it was still required that the strip of ornament was stuck to the wooden moulding by hand. Therefore although this machine certainly cut down on the time taken for the laborious casting process using small one-foot lengths, there was still much scope for improvement.

However, the following year, 1869, reveals two specifications for more sophisticated machines by A. C. Engert (Specification nos. 433 & 1746), one an improved version of the other, and the latter for "making plain and ornamental mouldings and ornaments for picture frames &c." The machine in question (**Fig. 26**) consisted of a bed along which a wooden moulding (already sized and presumably in the white, though this is not specified) was passed under a heated cylinder M, containing "plastic composition" from which the material is pressed to the wooden moulding (by a piston within the cylinder and a pair of rollers B). For "deeply engraved", designs, the composition (which could still be pressed out onto the bed from the cylinder), would pass under a segmental die P^x, which oscillated by means of a pivoting lever. The impressed "compo" band finally fell down the rollers W onto a wooden moulding X^2. This model also included knives and scrapers to remove surplus composition from the sides of the moulding and the strip from the bed. The die was cut to facilitate this operation and there was a rotating brush (mounted on the rocking arm), that dusted the die with powder before each sweep to prevent sticking.[59]

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[57] See Appendix I.
[58] See Abridgement Class Mouldings &c. 168, British Library.
[59] Adam Cyrus Engert & Co., like Gesell and Lea, seem to have been a most prominent company as they continue to feature in London trade directories from 1861, though at that point they describe themselves as "picture and looking-glass frame makers". It is not until 1868 that they appear as "gilt moulding manufacturers", which again may indicate that the machine had been developed some time before a patent was granted. Both Engert and Gesell and Lea continue to appear in directories right up to the end of the century and Engert & Co. seem to have expanded their premises, between 1861 and 1868 perhaps to accommodate the new machinery.

There is little doubt that, provided the Engert machine was reasonably reliable, it would have at least doubled the speed at which ornamented frame lengths could be produced (and probably a good deal more) and reduced the number of workers required.[60] The time-consuming stage of applying the ornament to the wood moulding was significantly reduced, although it was still required that the glue was first applied to the wooden mouldings by hand. Although less labour-intensive than hand manufacture, such a machine may still have required more than one worker to ensure correct and continuous feed of mouldings and composition, to guide the strip of decoration onto the glued moulding and to ensure its removal at the other end of the bed.

A further problem may have been the shape of the oscillating segmental die and not only in terms of its action on a continuous strip, which is clearly not as efficient as a roller. Whether there were gaps associated with the action of die on compo is just speculation, and no such gaps in pattern have been noted on frames though any mistakes were presumably discarded. The shape of the die may have been peculiar to this machine and therefore the range of patterns would be subject to the manufacture of dies especially for it, adding to operation costs.

The example that encompasses nearly all the processes that went into producing a composition moulding is specification no. 3664, by R. Scully (1876).[61] This machine, which included a hopper, E (**Fig. 27**) to which the material was added was known as a "pug-mill... for making composition ornaments in a continuous manner and applying them to mouldings such as are used for picture frames...". The basic differences between this and Engert's machine seven years earlier, were the fact that this performed a pugging or "kneading" operation on the composition before it was fed through to a *roller* engraved with the pattern, B. The ornamented strip was then fed over a further series of rollers, the last of which dipped into a reservoir of hot glue size O, coating the band ready to be applied to a waiting wooden moulding Q on a bed R, which has feed rolls moving at the same rate as those creating the compo band. It

[60] Mechanical moulding machines from the first half of the nineteenth century could produce up to twelve feet per minute.
[61] Like Engert & Co., Richard Scully is frequently listed in London trade directories, first under "picture and looking-glass frame makers" in 1861 and again appearing under "gilt moulding manufacturers" in 1868.

is unclear whether the feed rolls were synchronised in the Engert model and this feature may represent a further development. Clearly the engraved roller was an improvement on the segmental die.

This machine had now completely dispensed with the need for workers to apply glue to mouldings and the roller would have eliminated potential difficulties associated with the segmental die, ensuring steady production, perhaps at a faster rate than the Engert model (though it is impossible to be certain in the absence of the machines themselves). The "Scully" also does not use the method of passing the wooden moulding and its composition strip together under the die. This may be because the range of thickness in both wooden moulding and the desired compo ornament were extremely varied. Passing compo and moulding under the die in one simultaneous operation would involve individual adjustment either to the height of the machine bed or to the die, something that conflicts with the labour saving operation. Adjustments would not have been such an issue when enormous quantities of one pattern were produced. On the other hand, as a separate operation required someone to guide ornament onto moulding, there was probably little real advancement between the two examples. The lengths that were produced are important, not least for the storage implications. There seems little doubt that the "Scully" could produce twelve-foot lengths at a time, requiring space to feed such mouldings to and from the bed of the machine.

Descriptions of the finished article are occasionally documented, providing links to the patent machinery and evidence of variable quality, even at this date (1874). For example, the following contrasting accounts from "A Practical Hand" or practical manual refer to the specialist manufacturers dedicated to the machine production of moulding, which sprang up "in London, and in some of the principal towns of England" just prior to the time of writing.

> The manufacturer has certainly not been behind in producing patterns to suit the requirements of the public, as their name is legion; and great taste has been exercised in the patterns produced, the neat ornaments with which they are mounted oftentimes contributing to their beauty. ...
>
> Competition and price have brought into the market a lot of inferior articles, which it is not economy in

the Carver and Gilder to purchase, as they are found to be most defective and unsatisfactory. They are sometimes made out of cheap wood, the whitening coming up from the wood, ornament defective and broken off, all of which is obliged to be remedied by the workman before proceeding with the work [33, pp. 16 & 17].

By 1880, the specification of P. Bedeau (No. 5183, **Fig. 28**) shows a machine very similar to that of the Clifton from twelve years earlier, though apparently without many of the refinements. However, this machine represents a move towards significant simplification, underlining operating problems associated with the earlier, more complex, ambitious models, such as the gluing and simultaneous application of pattern to ornament, and ornament to wooden moulding. This machine may also have been aimed more towards the non-specialist producer who was not solely engaged in the production of picture frames, and it was therefore more versatile.

At the same time as these developments were taking place, machines that were clearly dedicated to the processing of "fibrous pulps" (as distinct from materials with similar properties to compo) are quite common.[62] In general, these models were geared towards architectural mouldings, though other ornamental articles are cited including picture frames.[63] The specification of A.G. and O.G. Hoehre (no.14,300, **Fig. 29**) claimed to mechanise the entire procedure and transformed the raw materials into the end product, "long ornamental and other mouldings" (no wooden mouldings are said to have been involved here). This may have been an advantage over the procedure for compo because the raw ingredients for compo would have been difficult to combine mechanically, requiring prolonged heating and relatively precise timing in their preparation. Patent evidence for the preparation of "fibrous pulps" indicates the extraction of excess water was the primary concern, and this was more easily solved with any machine that employed a pressing procedure.

By 1890, a far more sophisticated invention for "Moulding bars, columns, &c." was that of J. Heckhausen and J. Weies (specification no. 20,179) **Fig. 30**. This machine was similar in principle to the modern day spindle moulder but substituted patterned rollers (whether engraved or electroplated) mounted on spindles (in place of cutters),

[62] For example the specification of C. Varrot (1880) and L.D. Groth (1882). See Appendix I.
[63] Specification no. 10,422 (1888), F.L. Lawrence. See also Appendix II.

and applied pressure to a wooden moulding with "an outer covering of plastic or impressionable material" rather than cut into wood itself. Such a machine marks a significant departure from previous methods that do not indicate the use of more than one die used in different planes during one moulding operation. The moulding rollers, driven by gearing, achieved undercut mouldings by using two or more rollers arranged at the desired inclination round the moulding. Evidence from the 1890s indicates the popularity of bolder ornament with deeper undercuts, despite the fact that low relief patterns on more simple wooden mouldings still prevailed (**Fig. 31**).

The specification of O. Liepmann (no. 20,126, 1896 **Fig. 32**) is a far simpler machine than that of Heckhausen and Weies (1890) and it too represents greater versatility and efficiency over early more complex models such as the "Engert" and "Scully". The diagram indicates how three different strips of "plastic material" could be applied to a wooden moulding in one simultaneous action, though all in the same plane. The early Clifton model is very similar but did not apply compo to wood moulding and roll a pattern in the same process. Separate application may have allowed for greater variety in the end product but ultimately, real efficiency lay in producing a varied product with as limited a range of equipment as possible. For example, there were probably a few dies that fitted a set range of moulding profiles and a few that could be adapted. Thus the task of producing frame mouldings was at this point distilled down to the most essential operations with regard to the speed, efficiency and therefore cost of production.

The progression of evidence here clearly indicates that when a degree of variation could be brought to the same basic moulding simply by changing the pattern, (or even merely the colour or type of finish) there was little point in purchasing more complex, expensive mouldings and dies. This is clear from surviving frames. **Fig. 33**, identical to the walnut and gilt example from Morell's catalogue in **Fig. 34**, was probably produced by such a machine and is an example of the extent to which technological developments in frame-making resulted in a large degree of standardisation in the end product. There is little doubt that this compromised the quality of the object. Many more examples from the catalogue illustrate the extent to which one pattern was repeated several times on different mouldings and in a number of different finishes to augment the apparent variety, and this is commonly the practice in many trade and

retail catalogues today. If the pattern in question was unique to Morell's (they may have imported mouldings), the range of machined patterns was perhaps not so infinite as might at first be assumed.

Fig. 33 is almost complete and in its original condition (a few remnants of backing paper remain as a further potential source of information). Therefore the "frame-maker's" label dated 1903 (to the back of the frame, not the backboard) may be trusted.[64] Morell's only surviving catalogue is dated 1910 and thus patterns remained the same for quite a number of years.[65] Indeed, as Morell's were involved in "gilt ornament manufacture" from at least the 1880s, the same patterns may have been used for up to thirty years or more.[66]

Although this evidence shows that machines were still used for large-scale production, technical advancements in machines for use with moulding materials which had similar handling qualities to compo seem to have died out during the early twentieth century. Therefore the frame mouldings produced by firms like Morell's must have continued to use machinery which was a number of decades old by the date of their 1910 catalogue (corroborated by the above evidence) [46]. Demand had peaked and was not sufficient after the turn of the century to sustain continued developments. It is to be remembered that once the technology had been developed to a point, new die patterns could be used to cater for demand and these undoubtedly engendered a considerable outlay themselves.[67]

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[64] According to Berkshire trade directories.
[65] This deduction is based on the accuracy of trade directories and the frame-maker's use of an up-to-date trade label.
[66] See Appendix I.
[67] Machine technology for compo ornament seems to have been used right up to within the last forty years. Mouldings produced by the firm Coltman in the early 1960s were again reputedly produced by machines not dissimilar to that of Liepmann. The composition used in this instance was said to be a softer paste compared to the dough-like consistency of compo for general use in the screw press, though there is no record of the ingredients. Paraffin was used as a release agent during pressing. (Personal communication with an employee in Jackson's composition workshop who was employed by Coltman's in the early 1960s. The firm was situated in the Heathrow area and seems to have ceased trading in the 1960s).

3. Diagnostic Features

It is of primary importance to consider physical evidence for the use of both traditional moulds and machine pressed lengths on the frames themselves. This section will return to the latter after first considering the moulds.

If at least a few moulds can be dated this would provide information about when certain techniques were still extant and when old ones died out. There may be several key ways of doing this: by style of ornament, by the names that can occasionally be found on the moulds, and by the tool marks found on the blocks and there are other individually diagnostic features, discussed shortly. This section will consider all these points, though areas, such as the style of ornament, are clearly very large subjects in themselves and this section provides a couple of examples within the technical context of this chapter.

With regard to the second of these points, names are often found stamped into a limited number of moulds with a letter punch (**Fig. 35**), and it is sometimes suggested that these could be the names of the owners or manufacturers.[68] However, moulds bearing the initials "GS" (**Figs. 36** & **37**) have been carved with a chisel.[69] These particular moulds are consistently hand-dimensioned, presenting the possibility of an early nineteenth century or perhaps eighteenth century date. George Sully, who is listed in London trade directories under both "carvers and gilders" and "composition ornament makers" is one possibility, indicating an earliest date of c.1823. His trade card can be seen in **Fig. 38** but Sully may have been active before this without advertising. This evidence suggests that Sully had the expertise to produce compo ornament and to carve the moulds. Why Sully (or the individual responsible) carved as opposed to stamped his initials remains unclear. His ownership, as distinct from authorship, is not indicated by the extra time taken to carve the initials. However this does reveal the level of care and pride with which these objects were created.

[68] Personal communication, John Anderson, Frame Conservation, Tate Britain.
[69] Upon close examination with Christine Powell, Senior Gilding Conservator, Victoria & Albert Museum.

A further distinctive carved signature found on a limited number of the most finely and accurately executed examples, is that of "Wall" (**Fig. 39**).[70] A John Peter Wall of the Strand, is listed under "engravers of wood" between 1855 and 1868[71] and there is further evidence of a James Wall of Paternoster Square working in the last quarter of the nineteenth century [41, p. 190].[72] Certainly, the earlier of these entries indicates that moulds were produced outside the compo maker's workshop by a specialist woodcarver.

Letter stamped examples include "Mound", "Williams" and "Scard" (**Fig. 35**). As Scard, like Wall is a more unusual name, the moulds are probably those of Anthony Scard, listed as "Carver and Gilder" of 26 Goodge Street (active 1886).[73] There is also a William Williams of Clerkenwell listed for the same year.[74] Neither Scard nor Williams are listed under "Composition Ornament Makers" but "Mound", probably Lucien Mound (active 1866-70), like George Sully, can be found under both listings. The use of letter stamps as opposed to carved initials *may* indicate ownership as opposed to authorship, but Jackson's themselves do not have any moulds stamped with their name. In addition, Jackson's took over the firm Brown's in the 1930s, and their moulds were denoted by the letter "Y" in the numbering system on the end grain, but again no names are present.[75] It has been suggested that a further possibility for the presence of these names is that they were rented out, although no evidence has been found of this practice, and it may be difficult to prove.[76]

Whatever the implications of this evidence for the division of labour, considered in Chapter Three, this indicates that there was still demand for these moulds well into the second half of the nineteenth century, despite the introduction of machinery. This is further substantiated by the work of carvers such as Thomas Wilkinson Wallis. It may be no coincidence that these late moulds are all letter stamped examples as opposed to those with carved initials. This may suggest that although carved

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[70] For example, the private, working collection in Figure 42. Other examples can also be found in the Victoria and Albert Museum's "Jackson" Collection.
[71] See Appendix I. Also mentioned in [47, p. 57] as being active between 1856 and 1865. First mentioned in Pinto [41, p. 190].
[72] Pinto Collection, Birmingham City Museum.
[73] See also Pinto, [41, p. 190].
[74] See Appendix I.
[75] Personal communication, Ron Wood, composition craftsman, (since retired) Jackson's.
[76] Personal communication, Dr. Helen Clifford, course tutor, V&A/RCA History of Design Course.

themselves, these moulds were produced in an era where the wood carving tradition had largely passed. In this respect, Wall may have been an exception at this time. The fact that carving at this date, at least as far as frame making was concerned, was largely confined to these reverse carved moulds is indicated by Charles Tomlinson, who gives this account of the industry in 1858:

> ...it is rarely that an artist designs, still executes the carved work of a frame, on account of the costliness of the work by hand. Manufacturers are furnished with a set of moulds, by casting, any number of ornaments, in plaster, composition, carton pierre, papier mâché & etc. ... [48].

Despite the introduction of general workshop machinery like the circular saw, even by the middle of the century, the majority of workshops in the cabinet-making and related trades were still largely un-mechanised. However many moulds bear either the regular striations of a planer/thicknesser or circular saw (**Fig. 40**) and sometimes both. Moulds bearing the initials "GS" and the carved signature "Wall" are noteworthy for their distinct absence of machine marks. These examples are often well worn, exhibiting the irregular cuts of a hand saw both on their edges and end grain, (**Fig. 41**).

Planing machines, like the circular saw were developed in the late eighteenth and early nineteenth century.[77] In the first half of the nineteenth century, circular saws were used quite extensively for cutting veneers. Of course they were used for dimensioning the raw materials, but production was confined to saw mills. It was not until the second half of the nineteenth century that these developments were fully realised within the furniture maker's workshop, for which the most evidence exists.[78] By 1876 there is evidence that the larger London furniture makers had installed machinery (usually steam driven) for most of the processes for which it was available at that time. Therefore those moulds bearing machine marks probably date to this period or later, and were produced within or with access to such a workshop. However, evidence that mould makers were specialists (like "Wall") and therefore operating within small un-mechanised workshops, indicates that certain moulds

[77] The patent sawing machine (1793, specification no. 1951) of Sir Samuel Bentham, engineer and naval architect (1757-1831); the patent circular saw (1805, specification no. 2844) of Sir Marc Isambard Brunel, civil engineer (1769-1849).

[78] See Kirkam [49, p. 111]. The availability of such machinery outside the furniture maker's workshop

without machine marks could also date from the late nineteenth century.

Planing machines for producing wooden mouldings of more complex profile are worth briefly considering, for their use in frame-making. Such mouldings could be purchased as early as 1840 from moulding mills [49, p. 110] [79] and as Pat Kirkam points out, it is unlikely that those in the furniture trade, frame-makers or compo ornament makers, would have made their own. As much as twelve feet of moulding could be produced per minute. Therefore firms like Morell's probably bought in the wooden mouldings and applied the compo ornament to the lengths with another machine such as the Liepmann model of 1896.

Again, an intensive study of the profiles of frames is required to verify evidence of machine manufacture. An investigation of this nature may also establish the range of profile patterns used, providing links with specific firms to wooden moulding manufacturers. Such a study is considered beyond the scope of this research, though the network of connections within the compo and allied trades are considered in the following section. There is often no evidence of machine marks on those frames that have lost their backing paper to reveal the wood, again justifying research.

If the fine compo patterns on many frames are carefully examined, they are made up of shorter bands of less than a foot. The distinctive "join" or "cut" line, suggests that it was produced from an individual, hand-carved mould. This can be true even for delicate shallow ornament, well suited to machine production, that appears to possess a machine-like precision, that can be dated to a period where a machine example might be expected (**Fig. 43** and **Fig. 44**). This would be normal practice for a firm who attached strips of compo ornament from traditional moulds to machine-made wooden mouldings that were bought in. Other examples, like that in **Fig. 45** with composite profile, were probably machined as there is no indication of any "join" lines. Corner enrichments are not used in these examples simply because it was easier not to use them. On the other hand, examples can be found where fairly complex enrichments have been added to the main run of machine produced compo pattern,

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in the late nineteenth century is a subject requiring dedicated research.
[79] See also "Morning Chronicle", 25 July 1850.

such as the "Millais" frame in **Fig. 46** (possibly original to the painting of 1851).[80] Therefore, this example, with applied compo enrichments, which were almost certainly from traditional moulds, would be more expensive to produce. Such examples tend to be earlier whereas most late examples are far simpler.

Returning to the moulds, the majority of the hand dimensioned examples bearing the initials "GS" do not have the threaded screw hole in the bottom face **Fig. 47**, however this is often because they are carved on both faces.[81] Indeed, this very fact would argue against the need for the screw hole. As mentioned, this hole is thought to be particular to compo moulds (or other decorative casting materials) as one source says that it indicates that a "backing or thicknessing piece" was originally fixed, to withstand the pressure of the screw press. However there are a few important points here. The moulds are usually between 1 and 2 $^{1}/_{2}$ inches thick and very thin strips of boxwood containing bands of ornament are already mounted in thick support blocks (**Fig. 48**). Furthermore, there is no evidence to suggest that these blocks are not as old as the carved sections they protect. The majority of moulds seem substantial enough to withstand repeated pressure from a screw press, although box is known to split along its sometimes rather wild grain (**Fig. 49**). All the compo makers consulted do not use an extra support block in the press, indeed the screw hole is often filled with compo or other moulding material due to repeated use. On the other hand, the fact that certain moulds are permanently fixed in support blocks gives credibility to this idea (though it is usually glued in place). Mould makers could therefore have provided the means to attach an extra block if required, though in practice, it was one of those procedures that was omitted to save time. A further explanation is to secure the mould to the bed of the press to prevent any slippage when pressure was applied. This can be ruled out because it is not necessary to secure the mould in the press to prevent slippage, and no screw holes have been noted through the bed of presses for such a purpose. Other suggestions have included a means of securing the block to the workbench when originally carved, and this seems more sensible. One screw would hold the block securely to the bench while stop blocks would prevent any pivotal movement.

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[80] Personal communication, John Anderson, Frames Conservation, Tate Britain.
[81] The carving of moulds on both faces to save space (and boxwood) is considered in Chapter Three.

On this point, Pinto notes the trade in "fakes" that had existed when writing in 1968. At this time, culinary moulds were considered highly collectable, with the result that the back face of many compo moulds was planed down to remove any trace of the hole, which indicates use for compo [41, p. 184]. Indeed, compo moulds have been noted which have been subject to this treatment, though whether it was for these reasons is, as yet, unconfirmed.[82] It has been assumed that it was to re-flatten the mould after years of shrinkage had caused it to bow, cup or twist, creating problems in the press. Whatever the reason, it seems likely that this practice impacted on the existing stock of compo moulds in original condition. In addition, once any patina and wear to the edges has been removed, only the most inexpert of collectors would be fooled.[83] This clearly demonstrates the ignorance and lack of esteem in which these vital pieces of the compo trade have been held. There is no reason to doubt the authenticity of the majority of moulds for compo which do not bear this feature. This is not least because they are fairly heavy and robust and their subject matter is generally not that used for gingerbread, cakes or sugar ornaments, although there is obviously the occasional design in a smaller mould that could serve for both.

Another feature that may be used to trace moulds to a particular set/manufacturer is the painted end grain to prevent damp from penetrating. Black and white paint is mentioned, however green has also been noted and occasionally other colours [41, p. 184]. The mould identification number is usually painted or stencilled in black over the paint, although certain moulds have their number stamped in the end-grain (**Fig. 50**) and sometimes on the face and elsewhere (the paint is usually applied over this type of numbering). This is very often a four-digit number indicating the size of many collections.

Finally, design elements can be useful aids to identification but they are often the least reliable means of dating a mould. For example, elements such as the frond of a fern in **Fig. 51** is a motif that was prevalent both during the Regency period and the Aesthetic Movement but still offered as part of Morell's repertoire (**Fig. 52**) in 1910.

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[82] A small number of these have been noted within the "Jackson" collection, Victoria & Albert Museum. For example, W.129-1989 (450 x 83 x 33 mm) whose back face seems to have been machine planed.

[83] Certain examples are noteworthy for their dark, greasy patination, again an indicator though by no means a confirmation of some age. This may also indicate a certain level of usage.

This example demonstrates how the traditional compo mould could perpetuate the use of the same design element over a long time frame, particularly where it was important to keep costs down. This particular mould bears the signature of "Wall" and is therefore likely to date from the 1850s or '60s, thus helping to prove this point.

Occasionally a cast can be located from a mould, which can be dated more accurately through its design. The pair of Regency cabinets in **Fig. 53** are each mounted with a pair of compo crocodiles identical to those from the "A" and "B" moulds in **Fig. 54**, bearing the carved initials "SJ".[84] An enlarged view of one of the casts can be seen in **Fig. 55** that has been pressed from the top mould in **Fig. 54**. There are slight differences in the details of each mould and the casts reflect these differences precisely. It is even possible to detect the very small losses that have occurred to the extremities.

The weight of evidence for crocodiles as a design feature during the early part of the nineteenth century, and the fact that they are entirely in accordance with the date of the cabinets, argues against their being added to the cabinets at a later date.[85] The cabinets can be dated to at least as early as 1825, but the crocodiles represent Nelson's victories at the Battle of the Nile (1798) and Trafalgar (1805).[86] For example, they are very similar to ormolu mounts on the Nelson Vase in **Fig. 56** supplied by William Collins to John Fish *c.*1810, but they are smaller and certainly not identical.[87] The moulds may therefore have been carved shortly after such examples, either using them as a model or perhaps using a printed source.[88] Although no name has been located to which the initials "SJ" can be linked, it is likely that the moulds belonged to a London firm and were bought by the current London owner when that firm ceased trading. This does not indicate that a London firm made the cabinets but strongly suggest a

[84] The provenance traces these cabinets to Embley Park, Hampshire, home of Florence Nightingale and her family from 1825. They may have formed part of the contents of their previous home, Lea Hurst in Derbyshire. See lot no.184 in Sotheby's, "Fine English Furniture", London, 22 March, 2002.
[85] Personal communication, Jeremy Smith, Furniture Department, Sotheby's, London.
[86] Very similar crocodiles can be seen forming the hilts of swords at the same date (personal communication, Thomas Del Mar, Arms and Armour Department, Sotheby's London).
[87] Personal communication, David Beevers, Keeper of Preston manor, who has specific knowledge of the "Fish" suite. See also Gleeson [50, pp. 9-13]. This article notes that William Collins had a glass manufactory at 277 Strand and that he was "a celebrated maker of pier and chimney glasses and lamps". It is therefore most likely that he was well acquainted with the work of compo manufactories in London, although the precise nature of his operations requires further investigation.

London connection. Despite these questions, such an opportunity for attribution is rarely found and this example highlights the importance of the moulds as a means of enhancing our understanding of exactly how designs were disseminated. Again, this is made possible by the fact that the casts reflect all the fine details of their unique hand carved moulds.

Summary/Discussion

- Recipes indicate that the four-ingredient technology was in place as early as the 1780s. However, the fact that the Westwood formula is patented, and relatively early recipes like that of Nicholson did not contain all four of the main ingredients, suggest that the standard formula was not firmly established, even by the 1820s.

  The appearance of compo recipes within trade manuals at this time marks the end of a period of novelty and thus a relaxation in trade secrecy surrounding early developments. This juncture marks a shift in the balance to include the small-scale amateur production of compo. Such secrecy makes the task of mapping any technical developments rather difficult. Nevertheless, tests have indicated that despite variation in the ratio of the main ingredients from recipe to recipe within trade manuals, there were no significant developments during the course of the nineteenth century.[89] Certainly nothing that would indicate a decline in the quality of the material or a significant improvement upon Westwood's patent.

  This chapter has shown that alternative materials were continually being developed and patented throughout the initial period of the popularity of compo and subsequently. Although carton pierre and the continually improved papier mâché may have been more significant rivals, the evidence provided by patents only clarifies this to an extent. There continued to be experimentation around the middle of the century with various natural rubbers where flexibility was clearly of primary importance. The effect that these had on compo production levels is difficult to quantify at this stage.

[88] Helen White, (Department of Antiquities, Ashmolean Museum) was contacted to this end. The specific interest in the appearance and behaviour of crocodiles has been noted in Blagdon [51].

- Westwood's patent points to a far broader initial use of compo on ceilings and chimney-pieces for example. Clearly compo designs were being used on furniture of the 1810s in a similar way to ormolu mounts. However, picture frames and other non-specific uses of a decorative nature are also mentioned frequently, indicating that frames were probably one of the mainstays of compo production from the outset.

  The technical literature shows that the development of machinery is also linked to a greater degree of specialisation in picture frames. The fact that such specialist machinery was patented indicates the genuine demand for frames at this time, coinciding with the wider availability of photographs. This latter point, in addition to other advancements in printing techniques account for the comparatively late development of these specialist machines for frames. It is to be remembered that the important patents date to the late 1860s when technology is noted in the late 1840s and 1850s. Traditionally made frames whose patterns are well suited to machine production can still be found from the early 1860s, corroborating this documentary evidence.

- Developments show that the mechanisation of more complex procedures was explored in the 1860s and 1870s. However, developments ultimately resulted in a simplification of machinery in the 1880s and 1890s, leading to the greater standardisation of the end product. The turn of the century marks the end of this burst of activity, because the technology had developed to the point where no further developments were required to meet existing levels of demand. It does not necessarily indicate that demand levels had fallen, though undoubtedly changes occurred with the onset of war.

- The sustained use of manual techniques is perhaps a surprising point to emerge from research. Evidence suggests that traditional, intaglio carved moulds were still in demand and produced well into the second half of the century. This is perhaps partly because of the quality of the cast they produced, in addition to the

[89] For test see Appendix V.

freedom they imparted to the design of the object and thus the limitations of efficient machinery for anything more complex.

The cost of purchasing the machinery and a set of dies, was probably a significant factor in the emergence of specialist machine manufacturers, considered shortly. However, there may be other reasons for their enduring popularity, such as a reluctance to abandon traditional skills, a resistance to new technology, and the fact that there is often a small percentage of makers in many trades that will still provide a bespoke service.

- The use of traditional techniques, which could produce high quality casts, late in the century, goes some way to reversing the popular perception of compo ornament as a purely low quality, mass production material. Generally the skill and time invested in traditional tools and techniques far exceeded those required in machine production.

  Crucially, objects that can be identified as produced or assisted by machine often exhibit mean, low relief patterns, though the quality of the material itself is often rather good. It has been noted that the material used for such examples does not always bear visual similarity to compo. For example, the slate grey coloured material seen from the small chip to the frame in **Fig. 34**. Thus there may be an even greater connection between other types of moulding material and machine production than the patents appear to suggest. If this is correct, compo remained predominantly the material of traditional techniques and for this reason the output of mass-produced machine-made frames (from the traditional four-ingredient compo) may have been lower than is often assumed.

- The early nineteenth century shows compo to be one of the few successful alternatives to laborious woodcarving and perhaps to a lesser extent, existing casting materials such as plaster of Paris. The technical literature does not directly indicate that the flexible quality of a casting material was the stimulus for development. However, evidence shows that this quality was essential in its

application, and it is certain that it was exploited in the early years of compo production. For example the curve of a scotia in neoclassical ornament.

Certainly the ease and comparative speed over woodcarving with which compo designs could be pressed, wired through and applied, were greatly valued during the period following its inception, and these are a direct result of its handling qualities/flexibility. The fact that it produced crisp detail, and that its neutral colour and smooth surface were excellent for gilding without the application of gesso, would have contributed in no small way to its popularity as a decorative medium. Nevertheless, although the finishing qualities of materials like papier mâché were greatly inferior, their use for architectural mouldings meant that this was far less important. Furthermore, they were comparatively light, had greater structural strength and less prone to damage. Fibrous plaster, for example, did not require a wooden support (in the white) necessary for mounting heavy compo decoration.

Compo moulding technology at the end of the eighteenth century, and even the majority of the machines available later, were not capable of creating undercuts. Therefore, the technology and the material are directly linked to the low relief ornament of neoclassicism with which compo is first associated in any quantity. This link is something that will be further considered in conjunction with other factors during the following chapters.

Chapter Three: The Structure of the Trade

Introduction

This section aims to analyse and chart changes to the structure and organisation of compo manufacture through the nineteenth and into the twentieth century. It also considers the first source of batch production in this country.

- It has not yet been established whether compo was first manufactured by specialists dedicated to its production, within a carving, gilding or frame-maker's workshop as a substitute for carving, or pioneered by an individual. For example, was compo initially and subsequently batch produced on a sophisticated plane within the architectural interiors of Adam, or by specialist compo manufacturers like Jackson's?

- It is important to consider what other trades were involved and explore cross-disciplinary skills. This addresses the involvement of craftsmen, and the emergence of specialisation in the trade. The market position of compo is discussed in an environment where traditional lime plaster, plaster of Paris, lead and papier mâché were commonly used for casting ornament in any quantity.

- This section focuses on the role of the specialist and what form the organisation of trades may have taken, for example, via subcontracting. It is important to examine the extent to which the introduction of machinery for compo affected the way in which the trade operated, particularly in terms of tradesmen's skills

- The range of goods that were manufactured in compo and how this may have changed over time is important. This section in particular examines the extent to which the trade was geared to picture frames in the first half of the nineteenth century.

- There are further questions surrounding the sale of compo at a wholesale and retail level that can also be elucidated.

- Where possible, the size of a business, the number of specialists required, and how much ornament was produced are considered but production levels are the subject of the following chapter.

The weight of evidence lies in the late eighteenth and early nineteenth centuries, the reasons for which will be considered within the text. The early nineteenth century day book of the firm John Smith (c.1810s-1890s), a leading frame-maker and picture dealer, the earliest surviving customer account book of Jackson's (1805-1818), form substantial evidence for this section. They supply precise information on how the trade operated during these early years from a manufacturing perspective.

The discussion draws on select examples to examine the physical evidence. The production of moulds in particular is of considerable importance in adding to current knowledge of how the trade operated. The archives and conservation records of the schemes considered within the section dealing with Adam in particular were searched where available. For example, there are extensive records for Osterley Park House in the form of inventories, household bills and those of craftsmen, spanning the entire time frame with which the section is concerned. Other schemes like the Northumberland House saloon have very limited records of any kind, due to the varied history of the room, stressing their importance. The archives of many other schemes, for example Shardeloes Park in Buckinghamshire, were intensively searched without success, and they are not recorded here for that reason.[1]

Practically and as stated in the general introduction to this thesis, discussion and argument is based, as far as possible, on what the author recognises as original evidence. That evidence which is found to be non-original is cited only where it is relevant to the discussion. Methods used to detect whether compo in particular was present are specified in Appendix V. In most cases, it was possible to distinguish which material was used, i.e. the difference between papier mâché and compo, or compo and plaster, through observations with a hand lens and the naked eye. Of

[1] Shardeloes Park was built for William Drake M.P. between 1758 and 1766 and designed principally by Stiff Leadbetter (b.1705). Adam was employed for the interiors with Leadbetter's approval, and later additions were carried out by James Wyatt. Famous craftsmen such as Joseph Rose, Alken and Lawrence were employed for the plasterwork and carving respectively, but no mention of compo was found within an even broader time span than that under consideration here.

course judgement is based on a range of subtle characteristics, particularly when subsequent paint or gilding layers obscure the material, such as the uniformity of shapes and "join" or "cut" marks. These are viewed in conjunction with any other forms of evidence, whether they are historical, technical or both. Naturally, the ability to distinguish between the materials improves rapidly with practice. Limited scientific analysis was used to justify observations.[2] For example, the fixed frame over the chimneypiece in the library at Kenwood proved to be traditional plaster. However plaster was first identified through observation, and indeed, the room was decorated by Joseph Rose.

[2] These tests were conducted by Jo Darra in the Science Department of the Victoria & Albert Museum.

George Jackson & Sons

The firm of George Jackson & Sons (reputedly founded in 1780) forms an important strand of the research, not only because it is one of the very few old companies still producing traditional compo but also for its reputed connection with the Adam brothers. This section will focus on this early link and then return to consider the organisation of production.

The "language" of composition has been associated with the classicism of Adam, adding weight to a Jackson/Adam connection. The style of many of their moulds and pressings seem superficially to support a connection (**Fig. 57**). More than one secondary source includes George Jackson as the tradesman whom Adam employed to develop compo and carve the moulds for its use, for example this early twentieth century historical review of the firm's work from the architectural historian Lawrence Weaver:

> Many variations of a mixture of whiting, glue, linseed oil, and resin (or some of them), must have been in use before the day of George Jackson, but it was he who developed largely and practically for the Brothers Adam the use of "compo". At his little workshop in Ealing, he cut, under their direction, reverse moulds in box or pear tree in which the "compo" was pressed, and these are still in the possession and use of George Jackson and Sons, at Rathbone Place where also the secret of Adam's mixture is treasured [52, p. 4].

Beard also mentions the connection, but again without further reference: "George Jackson (1756-1840) carved reverse moulds in boxwood to press out the Liardet composition [53, p. 74]." A similar reference from the 1950s, mentions a George Jackson, employed by Adam to carve boxwood moulds and press out the ornament [54, 55, p. 3]. Jackson's themselves state that: "he [Adam] bought the famous recipe for composition from Liardet, the Swiss Pastor, and entrusted this to G. Jackson & Sons Ltd. in 1780 [56]". Again, this suggests that the Liardet "composition" that was made for external work, was cast from Jackson moulds. As no evidence of the ornament can be found, a link to the Jackson moulds cannot be proved. One early twentieth century source alludes to a John Jackson, who discovered the recipe of composition from Italian "plaisterers" working in London [36, p. 293], and this cannot be discounted but again, any real research into possible European origins is beyond

the scope of this thesis for reasons defined at the outset. Genealogical research has subsequently shown the name "John" is incorrect.

Efforts have been made in the past to discover the real origins of Jackson's. For example, Jane Rick, a curator in the Department of Furniture and Woodwork at the Victoria and Albert Museum noted the apparent lack of such evidence in a letter in 1992, while researching material for an article on Jackson's: "I virtually drew a blank at George Jackson & Sons Ltd.,....Maddening".[3] These efforts have been frustrated by the fact that they disposed of much of their historical documentation in their move from their Rainville Road works in Hammersmith to South West London in 1988, due to lack of storage space.

In order to produce designs on a large scale, regardless of the type of moulding material used, Adam would have required quite an extensive work force and the easiest route may have been to employ an existing company. However, Jackson's did not, as most references suggest, "...in 1780 set up in business at 49 Rathbone Place" [107]. George Jackson can be traced to 50 Rathbone Place in 1815-16, when he is noted, in the rate book for those years, as paying what may seem to be the considerable sum of £50 per annum.[4] However, by the end of the eighteenth century, £1 a week was said to be a common rent in London for a shop with living quarters and half or less in the provinces [57, p. 175]. This is borne out by comparison with the rents of other premises in Rathbone Place. For example, the charges range from £36 to £105 but many are around £60. From the detailed map (**Fig. 58**) of 1832 it is difficult to determine the extent to which size of premises relates to rent charges in Rathbone Place, but a comparison with other streets such as Petties [sic] Court where rents were between £14 and £16 per annum, shows a clear difference. Again, Hanway Street was cheaper, ranging from £15 (no.21) to £50 for no.17 which is one of the largest premises. (Although, numbering changes in London, Jackson's are recorded at both 49 and 50 Rathbone Place by the middle of the century, and clearly these were two separate premises).[5]

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[3] See Craftsman's File in the Furniture and Woodwork Archive, the Victoria & Albert Museum.
[4] A Joseph Wells (underlined) is listed under "Inhabitants' Names" and Jackson is under "Remarks". The previous book for the years 1813-14 clarifies this anomaly, where, as expected, the only person listed is Joseph Wells, indicating that Jackson took over the property between these years.
[5] See Appendix I.

By 1821, the first census of St. Marylebone reveals that of three families occupying the property, two were "chiefly employed in Trade Manufacture or Handicrafts", though it does not clarify whether they were skilled or unskilled. The age ranges of three males are also given, the eldest two of which are between fifteen and twenty and between forty and fifty.[6] Although the census specifies "families" involved in the trade, this may refer to the two eldest men, though it is interesting to speculate as to whether any women were involved. Although it would take an army of carvers to produce the same quantity of ornament as a couple of skilled compo makers in the same time, it seems that operations were fairly small if no other employees were brought in. Unfortunately no firm evidence of the scale of operations at this time have been unearthed to date. However it is known that the size of the premises at 49 Rathbone Place (next door) was fairly extensive as shown in **Fig. 59**.

George Jackson's dates have been quoted as 1766-1840 [52]. However we now know that he was born in 1779, and died in 1850. He was christened at St. Marylebone, son of Thomas and Susanna.[7] Thus if a *George* Jackson was involved in the production of compo for Adam in 1780, then he must have been from the previous generation; perhaps the brother of Thomas and the uncle of this George.

London trade directories, although not always the most accurate source, show two Jackson's in connection with compo, a "Thomas" and a "George". From the directories consulted, a Thomas Jackson at his "composition manufactory" in Tottenham Court Road is first listed in 1799, whereas George does not appear until 1817 at 50 Rathbone Place (only a year after his move there).

Another Thomas Jackson is also noted, again in Tottenham Court Road in 1763, as a "Turner, chiefly of Oval Picture frames" [58]. Whether there really is any connection here, is yet to be firmly established, but as Thomas was the name of George's father, the possibility is strengthened. Nevertheless, it is interesting that the address of Thomas Jackson, composition ornament manufacturer is eventually specified as 246

[6] See Appendix III.
[7] The genealogical research of Marion May, Jackson family relative.

Tottenham Court Road in around 1817.[8] Seven new houses in this road were built by the Bedford Estate c.1791 including no.246, establishing that the address of Thomas the turner was different to that of the compo maker.[9] The latter is named on the lease for that building from 1793 for a term of 31 years, vacating the premises in 1824.[10] It is unlikely that these two Thomas' were the same individual. George's son, another Thomas (b.1806),[11] lived in Ealing in the 1820s and he is known to have obtained a copy of his birth certificate signed by his Aunt, Mary Jackson of 246 Tottenham Court Road, required for his marriage in the Anglican Church in Ealing. Therefore the compo makers Thomas and George were almost certainly brothers.[12] Finally, in the light of Weaver's reference to George's "little workshop" in Ealing, research produced evidence for the ownership of property in that area in the nineteenth century, but no eighteenth century evidence could be found [52, p. 4].

Summary

This evidence definitely runs counter to the belief that George Jackson was the founder of the firm in 1780, as there is no evidence for the involvement of the previous generation (and Thomas was the father of Thomas and George) in the trade. Establishing a connection between Thomas Jackson, turner of picture frames and his name sake, the compo maker, may help to define a source for compo production in picture frames and better describe compo's evolution.

[8] See Appendix I.
[9] Woburn Abbey Archive.
[10] Woburn Abbey Archive.
[11] Registered at Dr. William's Library, (the genealogical research of Marion May, Jackson family relative).

Robert Adam

Robert Adam (1728-1792) was considered as a potential source of the first batch production of compo because there is so much anecdotal evidence for his involvement. A number of examples already quoted link Adam to George Jackson and Liardet but the Liardet "composition" was an external cement in terms of both material and application.[13] Furthermore, there is no indication, from the large quantity of original evidence on the Adam/Liardet/Johnson case, that the stucco was used or intended for any interior work despite much later anecdotal evidence to the contrary:

> Compo, or Composition ------Attributed to the invention of M. Liardet, a Swiss clergyman, has been used in France for the decorating of buildings, picture frames, and mirror frames since the time of Louis IV. It was introduced into England about 1767 by Robert Adam, who used it for low relief decoration of ceilings and walls, chimney-pieces, doors, and window shutters [36, p. 290].

As discussed, it is known that a type of composition was used on picture frames in France in the early eighteenth century, but again this source (that proved unreliable as evidence on George Jackson) refers to the Liardet stucco as the link to Adam. The fact that these patent stuccos of the 1760s and 1770s contained oil, (an ingredient that was erroneously though to impart durable qualities to the recipe, whereas it was soon proved to do exactly the reverse) seems to have much to do with past and enduring confusion here.

Adam was also considered because there is much evidence to support the fact that he gambled his economic interests on "new" materials. The Liardet stucco is one example (the Adam brothers paid Liardet a considerable sum to bring the patent under their control) and his likely involvement with the Company of British Cast Plate Glass Manufacturers is another [59]. This glass company was established in 1773 and financed by David Garrick and the Duke of Northumberland to the sum of £1200. The glass would was to be used for Adam's design for the Northumberland House saloon or "Spangle glass" room. The fact that the glass is French indicates the difficulties experienced in commencing production.

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[12] The genealogical research of Marion May Jackson family relative.

On these grounds, it therefore follows that one might expect to see evidence of the use of compo in Adam's designs before those of his contemporaries and, because the majority of Adam's output employed a small scale, repetitive design vocabulary. It is to be remembered that it was important to Adam, in common with other eighteenth century entrepreneurs such as Matthew Boulton (1728-1809), that he was seen as a leader in both design and materials and this tends to obscure the truth behind his associations with innovations.

Several examples of Adam's work were examined in the search for compo. These were chosen for their date, their use of neoclassical ornament and because they are London sites; the majority of early evidence, including Jackson's, favours London as a major centre for innovation and the first site of batch production. In addition, London was the site of much of Adam's later work when he was involved in speculative building projects, and therefore when he was most likely to have used compo. Examples such as Kedleston were excluded for these reasons. Osterley Park House was selected to determine whether compo was used in the 1760s. The Northumberland House drawing room (c.1773) was thought to be the most promising site because of its reputed use of compo and Adam's other business dealings with the Duke. It was therefore the subject of a case study that is briefly summarised below.

- No evidence of compo was found at Osterley. However other imitative materials were used, such as the dado moulding in the Green Drawing Room (**Fig. 4**) that was made of papier mâché of the layered paper variety. There were also examples of cast lead ornament. Close examination of the archives also failed to produce any compo that could not safely be dated to the nineteenth century on account of its style. Crucially, most examples of small scale repeat pattern were carved where compo could have been used with greater expedience, including running patterns round the door cases in the small state dressing room in the Etruscan style 1775 (**Fig. 60**). It is therefore no surprise that the major furnishings designed by Adam for the house exhibit the finest carved repeat ornament, such as the State Bed designed in 1776 as showpiece (**Fig. 61**).

[13] Doran, Victoria, unpublished research into the involvement of the Adam brothers with patent compositions for exterior work.

This indicates that papier mâché and lead were readily available but carving was still the most commonly used and widely available means of producing small-scale repeat ornament at this time. This also suggests, in line with economic evidence of Chapter Four, that skilled labour and therefore carving was relatively cheap. This would account for the limited use of papier mâché and lead.

- The library at Kenwood designed by Adam between 1767 and 1769, was also investigated, partly because Adam used his "new invented patent stucco" on the exterior of the house. The library however, like the majority of designs by Adam employs traditional lime plaster, commonly used for large interior schemes at this time and used by Joseph Rose, who worked for Adam on most of his projects. Again, the furniture designed for this room by Adam is finely carved. Indeed, all the furniture or frames that could be reliably attributed to Adam were either carved or moulded in plaster, hence their exclusion from this discussion.

- Syon House was considered primarily because it was for the same client as the Northumberland House saloon where compo was reported to have been used. Although it represents a scheme at the very top end of the market, the materials used within its fabric are both traditional and imitative. For example, the shutters in the red drawing room are of gilded lead and the floor of the anteroom is of scagliola.[14] Thus coloured paste was acceptable for the sake of art as a substitute for the real stone of pietra dura work. Scagliola enjoyed great popularity as inlay for chimneypieces and was used for the chimneypiece in the green drawing room (1773) that came from the Northumberland House saloon. Much finer shaded effects could be achieved using this paste, than with real coloured stones and it was acceptable because it could be used to "improve" on the original material.

  Artificial materials were successful precisely because they were a good imitation, or even an improvement on the original (or tradition). Certainly their use within this house has nothing to do with economy; the use of ivory for door cases

[14] The lead shutters were supplied by Mr Bermingham or Brimingham. The floor of the anteroom was entirely renewed in 1831 by William Croggan but it is thought to be an exact replica of Adam's

indicates this. Compo too, like papier mâché could be made acceptable in such a way, though painting or gilding. Therefore the presence of papier mâché and not compo in the scheme again suggests that it was not readily available at this time.

Mary Anderson, in her observations on the colour scheme in the gallery commented that "all the Ancient Bass Relievos [are] either painted al fresco or done with Papia Machee upon a very faint Sea Green stucco... gives an elegance & delicacy I cannot describe" [60, p. 98]. Not only does this indicate that papier mâché was commonly used at the time and that compo was not, but words such as "elegance and delicacy" imply that this cheap material could achieve quality results and was equated with fashion and high design. It is reasonable to conclude that compo was eventually used within a similar context as a more advanced means of achieving the same end because compo would produce finer casts than papier mâché (at this time) and had the great advantage of flexibility.

- The Northumberland House saloon (c.1773) was de-installed at the Victoria & Albert Museum in preparation for the British Gallery refurbishment and opportunity was taken to examine all the (remaining) sections.[15] Following an intensive study of the different parts of this room, their plans and related archival material, the following paragraphs are a brief summary of findings and conclusions.

  Again, cast lead is used extensively, certainly for all the elements covering the glass areas and the sections of moulding where a cast would be more expedient than carving. Like the previous examples, it is clear that the expertise for lead casting was readily available. Lead would also be the material of choice where many embellishments were placed over glass and needed to be self-supporting. It might be argued that the whole scheme was an experiment to include the use of the "new" compo. However if Adam were to have planned a scheme for his first use of compo, he would almost certainly not have chosen to cover the walls in glass, or indeed cast a number of sections from papier mâché. The ornament on all

original. William Croggan was Mrs Eleanor Coade's successor at her Lambeth manufactory. See, Jackson-Stops [60, pp. 93, 96].

the main sections of this room is finely carved, indicating that carving was still the usual form of creating repeat patterns at this date and that Adam employed a number of different specialists on this scheme.

There are further problems with the use of compo in this scheme. Many of the compo design elements do not correspond to the lead and carved designs. However, a key section in analysis is W.3:28-1955. This shows half the ornamented section entirely cast in lead, the other half, has only the relief decoration cast in compo and attached to a wooden fillet (**Fig. 62**). Although of the same design, these elements are clearly from different moulds, because the quality of the cast, even the depth of the design is different in both. The fact that compo produces a more accurate cast than lead cannot account for such striking differences. In addition, there is only one paint layer covering the compo section but this same layer covers an older layer on the lead section, again indicating that the lead section is original and the compo a later addition.

The history of this room shows that it was slightly enlarged and had a cove placed around the original flat ceiling **Fig. 63**. As the earliest known illustration (said to post date 1819) shows the cove in place, evidence suggests that fairly extensive alterations were made at a relatively early date [61, p. 314]. This meant that the frieze indicated in Adam's plan illustration (**Fig. 64**) was quickly redundant, although as King points out, this room "was altered a little from the Adam designs, possibly because of the unusual nature of the task" (compare **Fig. 64** to **65**). Further examination of the archives, confirmed the alterations during the late 1810s by Thomas Ponsonby, carver and gilder.[16] It can be no small coincidence that there are half a dozen entries for Ponsonby in the Jackson ledger, and his own compo ornament is frequently recorded within orders for other tradesmen supplied by Jackson. For example on October 6th, 1817, Jackson's supplied "Mr Goslet from 179" with "4 Ponsonbys honeysuckles" at a cost of 1/4. It is also to be remembered that honeysuckles feature heavily in the design of the saloon.

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[15] (Museum no. W.3-1955). Sections of the original room remain after a chequered history following the demolition of Northumberland House in 1874.
[16] Alnwick Castle Archive.

If Adam did pioneer the use of compo then its use must have been confined to the very last phase of his work in London, which has largely been destroyed chiefly by demolition.[17] The evidence presented by these examples indicates that Adam did not use compo during the 1770s either for the fabric of the interiors or for furniture and frames within, many pieces designed for the rooms. Carving was still the most widely used means of creating repeat ornament and casting materials were commonly lead and papier mâché.

In addition, the very fact that cheaper batch production materials like papier mâché and lead were commonly used at this time on these high status schemes, argues against compo being reserved for large speculative schemes of lower status.

[17] Major building projects such as the Adelphi may have yielded evidence of its use.

The workshop system and the division of trade

To understand how the production of compo ornament may have evolved within specialist trades such as carving, gilding and frame-making, it is necessary to say a brief word about the workshop system and the division of trade just before and around the late 1770s and early 1780s; the time compo is estimated to have first evolved on a batch production level.

At the time of the Northumberland House salon, London trades, such as carving, gilding (and furniture making) were still under the control of their guild system of Livery Companies. This generally involved an apprenticeship of seven to eight years under a master after which time an apprentice would enter into a Company. There were certain rules, such as the restriction on the number of apprentices that could be trained and by whom but these rules eventually led to alternative methods of entering a trade, such as patrimony and redemption.[18] This meant a certain relaxation of the rules, enabling men to enter areas of the trade quite different from that for which they were trained. Despite efforts to regain control, much of the Livery Companies' powers had been lost by the beginning of the eighteenth century.[19]

In the second half of the eighteenth century, although economic growth prompted the expansion of premises and diversification of trade within the furniture business, large firms were already involved with all the various branches of the trade that could be undertaken as specialist enterprises themselves.[20] For example, the partnership of James Whittle and Samuel Norman with John Mayhew, advertised in 1758 that their company was in new premises and that they would "continue to carry on the Upholstery and Cabinet, as well as the Carving and Gilding Business in all their Branches" [64, pp. 501-13].

It was the upholsterer who was at the top of the trade hierarchy at this time, primarily because he was often responsible for the whole of the interior, from the joinery to the cabinet work, the draperies and the soft furnishings. He was "a Connoisseur in every article that belongs to a House [65, p. 169]. Campbell also notes that amongst

[18] Either inheriting the freedom of the Company or buying one's way in respectively.
[19] It is important to note that this complex subject is part of a large debate.
[20] Many businesses were involved in the luxury trade at this time. See, for example, [62, 63].

carvers, there was a species "who do nothing else but Carve Frames for Looking Glasses" such was the demand for frames at this time [65, p. 174]. Not surprisingly perhaps, a London training was by far the most prized. In 1761 carvers were still prospering, at least as far as the furniture industry was concerned when Joseph Collyer noted that: "as a taste for carved work in chairs and other furniture prevails, the ingenious men among these kinds of Carvers are never out of business" [66, pp. 150-1].

As the guilds began to lose their hold, so trade societies began to appear in London in the 1780s following a series of strikes. These helped to negotiate piece-rates and new shorter hours. A revised book of prices was issued in 1793, that was the subject of further strikes in 1797, when masters tried to reduce prices further, however the 1793 list won out. The timing of this price setting may have had some impact on compo. These changes were previously thought to be of relatively minor importance in the wider context and that it was not until the introduction of steam powered machinery in the larger workshops that any significant changes took place but as regards the production of compo, this may not be the case.

Although trade cards will be discussed later, there is one important piece of advertising that may present evidence for the earliest batch production of compo. This is part of a catalogue, the main plate entitled "N° 303 Chimney-piece complete" (**Fig. 66**):

The numbers on the Chimney-piece, refer to the single Ornament, engravd full size: & are sold separate or compleat _____
Their Elegance, Duration, & Cheapness, are best recommended by a comparison with other Carvings _____ [67].

Although compo itself is not mentioned, it is clear that the subject of this piece of advertising is a substitute moulding material. There is nothing to immediately suggest that this was not metal, yet the comparison to the material and aesthetic qualities of carving, and low cost, suggest that the material used here was both perceived as imitative of carving and retailed as such. Each design element on the chimneypiece refers to another plate where they are featured "full size" (**Fig. 67**) showing how a

design could be made up of different elements of the purchaser's choice. Two of the plates are dated "Dec[r] 20, 1776" and "May 20, 1777", "... J & O Westwood." It is almost certain that the O. Westwood here is Obadiah Westwood, the Birmingham button manufacturer and patentee of the 1786 compo recipe. This specification appears ten years after the catalogue and thus Westwood may have used his recipe some time before obtaining a patent. If these deductions are correct, and this is the favoured conclusion, then compo was used before Jackson's (unsubstantiated) 1780 claim to its origins.

Assuming that this evidence does represent compo, there are two other pieces of information within this example. First, and as for the patent specification, the broad range of uses for which compo was employed at this time included picture and looking-glass frames and even ceilings. Second, this source is from Birmingham, whereas London has generally been regarded as the source in this country, particularly with regard to Jackson's. This may suggest a link with Wedgwood or Boulton. Certainly Wedgwood was a key figure in the use of cast ornament in a similar way, though it may be impossible to establish any real connection. Furthermore, although the weight of evidence favours the Westwood compo (or an early experimental, analogous form of it), it should be recognised that this may be too great a leap to make. It is just possible that these designs were cast metal at this point. The comparative difficulty of casting in metal was perhaps something that prompted the development of the 1786 patent. In his survey of the metal work pattern books in the Victoria & Albert Museum, Nicholas Goodison notes that of the two catalogues that "can be attributed to Birmingham manufacturers, 8(M.64g) is not a typical catalogue". It is clear from examination of the various types of catalogue that he means typical of the type of designs (and applications) provided for the supply of furniture brassfoundry [68, p. 8]. This may further support a theory that favours compo.

There is however yet further evidence in favour of both the compo and the cast metal theory. Obadiah and John Westwood are listed in a Birmingham directory for the year 1770 at 37 Newhall Street as "Engravers, Die Sinkers and Coffin Furniture makers" [69]. This suggests they were involved in the manufacture of moulds *and* the casting of decorative metalwork, some of which would be functional. This involvement in the complete production process is of great interest, as the

evidence examined in Chapter Two suggests the possibility, but does not confirm the production of moulds and the casting process under the same roof. There is further evidence of this connection in the following paragraphs.

Interestingly, button making, as part of the Westwood's business, is not mentioned at this date. However, there are a great many tradesmen listed, and it is evident that button making is naturally connected with die sinking. For example, at 43 and 45 Dudley Street respectively, there is a Theodore Sadleir, "Button Mould Turner" and a John Willinger, "Button Maker and Die Sinker" [69]. Not surprisingly, there are a great many die sinkers and engravers listed. As the Westwood's were button makers at the time of their 1786 patent, it is worth considering the button making trade at this point:

> This Branch is very Extensive, and is distinguished under the following Heads, *viz.*Gilt, Plated, Silvered, Lacquered, and Pinchbeck, the beautiful new Manufacture Platina, Inlaid, Glass, Horn, Ivory and Pearl: *Metal Buttons*, such as Bath, Hard and Soft White, & c. there is likewise made Link Buttons in most of the above Metals, as well as of Paste, Stones, & c. in short the vast Variety of sorts in Both Branches is really amazing, and we may with Truth Aver that this is the cheapest Market in the World for these Articles [69, p. 85].

There is little doubt that the development and use of compo was linked to button production at a relatively early date, and this description of the trade suggests that it was a particular site of innovation and an area for further research.[21] The fact that turning is also connected with button moulds may offer a connection between the Thomas Jackson, turner (of oval frames) and the Thomas Jackson, composition ornament manufacturer. On the other hand, there are references in Birmingham (1770) such as that of William Whynall, "Carpenter Joiner and Mould Maker" that suggest other branches of the trade as possible sources of manufacture. In addition, George Leader "Carver To His Majesty....NB. Moulds Sunk for Cooks and Confectioners in the newest Taste...Sells all Sort of Turnery and Toys" (1803 & 1814 **Fig. 68**) is known have carved moulds and to have produced compo ornament, again countering the theory that these two practices were separate. This evidence may also indicate that compo moulds were by no means the greatest source of a carver's

[21] Personal communication, Dr. Helen Clifford, course tutor, V&A/RCA History of Design Course.

intaglio work and demand could easily have been exceeded by that for culinary wares.

Whatever the "route" of manufacture, both trades were clearly capable of creating the moulds, whether compo manufacture emerged in Birmingham, within the skills of the engravers and die sinkers, or in London with the wood turning, carving and frame-making trades. As mould making required the greatest degree of specialisation, it would not be a great extension of production skills to make and cast compo.

As a footnote here, papier mâché ornament makers are listed in trade directories but there is yet no mention of compo makers, and a clear distinction is made between the two trades when they do appear in the 1780s. Again this indicates that during the 1770s, the use of compo was still very much in transition from isolated individual preparation and experimentation to batch production.[22] Trade cards provide further evidence.

The Nineteenth Century

Compo ornament production on a large scale in the first half of the nineteenth century, existed within certain branches of the trade such as frame-making and specialist composition manufactories like Jackson's.

The location of specialist workshops indicate how sites of labour helped to encourage specialisation but at the same time, a degree of diversification and the dissemination of skills. For example, many carvers and gilders could be found among the furniture makers of the St. Martin's Lane and Long Acre districts of London and there was a particular concentration of them around Oxford Street, Tottenham Court Road and slightly further east in Clerkenwell. It is not surprising therefore that these were the areas populated by composition ornament makers. Location promoted a close knit community and of course marriage was a further means by which businesses were strengthened, for example, the connection through marriage, of the Jackson and Holland family in the early twentieth century.[23] Location also provided strong commercial competition, as patrons found it easy to locate and visit a number of businesses at one time and to compare price and quality. Specialist machine

[22] Listed in both London and Birmingham trade directories.
[23] Personal communication, Marion May, Jackson relative.

manufactures (though there were many exceptions) were more frequently located even further to the east or north, undoubtedly because large spaces could be rented more cheaply. For example, "gilt moulding manufacturers such as "Gessell and Lea and Gedaliah Angel were both situated near the Spitalfields district and Richard Scully (1860s), William Hieronimus and A. C. Engert & Co. (1870s) in the Finsbury area.[24]

Although composition making was not a craft necessarily demanding great specialisation, it did rely on the moulds, and thus if a frame-making workshop were to produce compo ornament on their own premises, they would need a reasonable stock of these. The acquisition of a stock of moulds would require a substantial expansion of the business in terms of space and cost. Furthermore, continued outlay would be necessary to replenish the existing stock with the latest designs. As compo designs would keep for several weeks if carefully wrapped, the obvious course would be to buy these designs ready-made from the specialist manufacturer. Although compo making required relatively simple ingredients, the majority of which were available within the frame-maker's workshop, it did require a degree of skill developed over time. This was something in which the frame-maker, too busy with other processes, might not choose to invest when designs could be purchased. For example, decoration on harps of the early nineteenth century indicate the presence of designs bought in from manufacturers as such a trade was obviously highly specialised (**Fig. 69**).[25] Therefore, it is reasonable that the designs would have to be purchased from a specialist and the carved moulds would almost certainly need to be specially commissioned for the task (at least in the first instance).

The ledgers of John Smith a leading frame-maker and picture dealer of the early nineteenth century (1812-1830s), whose customers included the Prince Regent, Lord Byron and the Earl of Yarmouth present highly significant information about the way in which the compo and allied trades operated. Jacob Simon observes that: "...the day book shows how Smith regularly identified his ornament by framemakers' names" [1, p. 140]. He cites various examples:

[24] See Appendix I.

Thus for Lt-Col. Addenbrooke in 1812 he produced two 'handsome frames', richly ornamented with 'Temples bands, My Corners, Egg M[ouldin]g with inside oval Turn'd Spandrils enrich'd with Blundels Dolphin ornament'. Temple was presumably the leading maker, Thomas Temple, and Blundell probably William Blundell.....A veritable panoply of ornament, named for the most part after framemakers.

In fact there is a Blundell listed as "Blundell & Pritty, Composition ornament manufacturer of 6 Little St, Andrew's St." in a London trade directory for the year 1814 and a William Blundell is noted at the same address and trade in 1823-4.[26] Temple was almost certainly the frame-maker Thomas Temple and as there are no listings for Temple under composition makers, clearly frame-makers produced their own composition ornaments without advertising.

Other examples from the same source include "...Jacksons large Shells..." (1812), "...Freemans Gothic flower..." (1814), "...Woodburns French bands..." (1816) and "...Leaders scrools & small scallop shells..." (1817) [70]. Leader, listed as a carver in Oxford Street in 1802 was quite a prominent tradesman. His card however gives no direct indication of any involvement with composition. Smart is also cited in the ledger and he too was a composition manufacturer.[27] Jackson, according to trade directory evidence, is Thomas Jackson, composition ornament maker, at this time. Woodburn has not been discovered in any sources except the Jackson ledger, but his presence in both sources indicates he was also a producer, though it is not known if he was also involved in frame-making.

Smith's day book also verifies that compo ornament was sold ready-made. The pages indicate that composition ornaments were bought for his picture frames from a variety of firms. This poses key questions: was it not worth producing his own ornament, and why did Smith need to buy in ornament from others? A reasonable explanation is that he did not have a large enough range of ornaments to meet the demands of his customers and indeed he would not need an extensive stock if they could be bought

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[25] It was not worth the musical instrument maker's time devoting a section of his enterprise to decoration in this way. For example, there is an order from the harp maker Sebastian Erard of Great Marlborough Street in the Jackson ledger (the entry is not dated but the adjacent page is for 1804).
[26] He could be listed for 1812, but has not been noted in listings for 1809-11. See Appendix I.
[27] See Appendix I.

in. The fact that separate design elements are attributed to known compo producers confirms that the design elements are compo, because they would have to be if applied individually in this way. However, Smith clearly states: "My Corners" as distinct from those entries referring to the design elements of others, confirming that he produced designs from his own stock of moulds. This also confirms that a producer of ornament was not confined to his own stock of patterns provided by his own set of moulds and frequently used the ornament of others at the request of a particular tradesman, and according to his particular customers' orders. This is particularly apparent in the following entries from the Jackson ledger. Jackson's reference to their own ornament is probably denoted by the *lack* of reference to another individual's designs.

Simon attributes the entries in the Smith ledger with quite a different meaning, assuming the designs of others were copied in some way as opposed to bought ready-made and "soft from the press" from others.

> There was no copyright in ornament and it seems that Smith borrowed patterns as he required from other framemakers in order to keep up to date. The process of assimilation has not been established conclusively, but it seems probable that Smith made drawings of ornament he liked as a point of reference, or may even have had the chance to take plaster casts, and then had boxwood moulds carved up for permanent use for pressing out compo ornament as required. Presumably other leading makers did likewise, with the result that much the same range of ornament could be found at each of the leading establishment [1, p. 140].

Of course, if a tradesman wished to copy a particular pattern/design element he could make a cast from any ready-made ornament that he had bought from another tradesman without the need for drawings. This could be used as a model for the carver to create a more permanent mould. Therefore, it is certain that similar ranges of ornaments were available at all the leading firms at the beginning of the nineteenth century, particularly the more common bands of repeat pattern. There would also be the more distinctive designs, recognised by both tradesmen and consumers as the product of a particular firm. Naturally, the tradesman would need to produce new designs to attract the customer to his particular firm. Special projects also meant that unique moulds were produced. For example, Jackson's were able to secure the restoration of frames at Windsor Castle precisely because they recognised an unusual

design for which they had the original mould (**Fig. 70**).

Thus compo frames at this time, as Simon himself points out in the quotation, were made up of a variety of elements from different sources. Therefore, it was the distinctive combination of these elements that assigned a particular frame or object to a maker. The very fact that certain design elements were known to be from different individuals indicates that they were bought from them and not assimilated at all. Of course it is just as unlikely that one maker would allow a rival to take a cast of his ornaments as he would have allowed him to make a drawing. However, if design elements were sold to rivals in the trade or to customers who allowed access for copying, there would be no means of preventing it.

Although frame-makers, exemplified in Smith's day book by Thomas Temple, were clearly involved in producing compo, the presence of major compo manufacturers such as Jackson's, Freeman and Smart suggest that these types of firms were the greatest source of compo ornaments. The firm of George Leader may at first seem fairly unique as his card indicates the carving of intaglio moulds (albeit advertised for culinary use) and his appearance in the ledger suggests he was also a producer of compo (**Fig. 68**).[28] Many carvers and gilders either became dedicated to the production of these moulds with the introduction of composition and/or supplemented what were often frame-making businesses with the production of compo ornament. The trade card of Criswick and Ryan for example (*c.* 1836) shows that they made compo but they are known as frame-makers and listed as carvers and gilders within London trade directories, **Fig. 71**.[29] Therefore, although one process required highly skilled carvers and the other existed precisely because that type of skill was no longer required, it makes sense that these processes often existed under the same roof. This enabled firms to serve two markets and ensure development.

Chapter Two has shown that manufactories commonly produced "squeezes" or negatives particularly from compo and sulphur. Although this indicated a need to create a "one off" mould for a limited run, it may also show that intaglio carving skills

[28] No moulds bearing this firm's initials have been found to date, though their stock could have been unmarked.

were not readily available within a firm. However, certainly at the end of the nineteenth century, large firms such as Jackson's did have a dedicated woodcarving workshop (**Fig. 72**). Although the highly specialised skills of an intaglio carver could be acquired by the carver in relief, dedicated practice was required to perfect the art. This suggests that such moulds were not widely produced "in house", although it seems reasonable that they supplemented their stock occasionally with less complex patterns.

It is fortunate that one ledger of customer accounts from a major compo producer such as Jackson's, dated 1804 but actually containing information from the years 1805-1818 has survived the destruction of much of their archive material.[30] This source presents an extremely valuable record of production from the perspective of one of the suppliers of ornament mentioned in Smith's day book.

It is exciting to find that these pages present a similar picture to Smith's operations and indeed, many familiar names are mentioned [71].[31] For example, there is a Cribb and Son, probably Robert Cribb, frame-maker and printseller; Dolman and Son, the Criswick and Dolman of the 1860s and '70s; Eckford is the carver, gilder and frame-maker C.J. Eckford; Freeman, who advertised as a composition ornament maker; Green was another large producer of compo ornament; Leader is mentioned; Smart is John Smart, who advertised his "composition ornament manufactory"[32] and is noted in Smith's day book, as is Woodbourne, who receives many entries; the familiar name of Nash, and an intriguing entry under "M Jackson Father".

Dated 1805, the following entry is one of the earliest. The Saunders mentioned could be William Saunders, one of George Romney's frame-makers who, from this evidence, was employing Jackson's to make frames for him, though these may have constituted a small portion of his operations.[33] William Saunders own accounts show he was carving frames in 1783 and this had changed little by the mid 1790s (**Fig. 73**).

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[29] The firm was established as J. Criswick in 1818 but by 1836 were trading as Criswick and Ryan. By the early 1840s there are noted as Criswick and Leppard. See also Simon [1, p. 133].
[30] Jackson's are reputed to have burnt much of their documentary archive during the move to smaller premises in Mitcham (1988). Personal communication, Richard Hallas, National Portrait Gallery, 1998.
[31] See also Appendix III.
[32] See Appendix I.

His account book is straightforward with the goods supplied direct to his customers, unlike the Jackson accounts. This Jackson entry contains evidence for both carved and compo ornament.

1805	M. Jackson Father	
Octb[r] 24	2 Frames for Saunders	
	Cutting 2 Lengths of Flowers	£ _, 12s, _d
	Cutting 1 Corner leaf for D[o]	£ _, 7s, _d
	Cutting 1 Corner Husk for D[o]	£ _, 4s, _d
	Ornament[g] 2 old frames for D[o]	
	With Corner Centres & Smart & Bowers foliage	

And

24 [Nov]	Laying on 2 Setts Large leaves on}	£_, 12s, _d
	2 Old frame for Saunders }	
	8 Ovel Shells for D[o]	
	30 ft Raffle leaf & Tongue on D[o]	
27	1 Large frame Temples Corner & Centres & c. [71]	

It is clear that carving is denoted by "cutting" as distinct from those design elements in compo, again indicated by the names of other makers such as Temple. This fact is further clarified by the prices of these individual motifs (discussed later) that are only quoted for "cutting" designs. This suggests a link between the business of a younger Jackson and that of his father, making it unnecessary to record certain prices in the usual manner. Whether the younger Jackson was George, in his mid twenties at this point, or possibly his brother Thomas, is not specified in the ledger, though the firm is only recorded in the trade directories under Thomas in 1805. This is the strongest evidence yet that an older generation of Jackson's was linked to the compo industry at the time of Robert Adam. From this evidence, it may at first appear that this older generation was still geared towards an industry dominated by carving, although working closely with the younger compo producing generation. However, on closer inspection, the carved elements consist of individual motifs, which suggests that they

[33] See Appendix III.

were in fact reverse carved moulds (obviously each side of the frame was carved as one, if carved in relief). Furthermore, carving and compo skills are clearly available within the younger Jackson's workshop. Therefore it is of considerable interest that carved elements disappear altogether in the majority of the later entries. This may suggest a "transitional" period, when the frame-making industry was changing from carving to compo, but it is more likely to indicate that moulds were no longer being produced.

There is another later entry for a "Mr. Thompson Oxford St." which suggests that intaglio carving skills were still required in 1812-13. This unusual entry, that includes fabric and "1 Old Flight of Stairs", cites "1 Gothic Patterns to Shew 2 faces" (and a repeat order the following day).[34] This almost certainly describes a mould very similar to that in **Fig. 36** of gothic design (initialled "GS") and carved on both faces of the mould. Other information within this entry such as three orders for parchment and one for glue suggest Thompson was involved in gilding and was producing compo designs from moulds bought for the purpose. The high cost is also indicative of carving a mould.[35] The rarity of this entry at this time suggests that Jackson's were not greatly involved in exploiting their intaglio carving skills outside their own workshop. It could also imply that most firms had already accumulated a good stock of moulds by this time and further orders were therefore comparatively few. The gothic design may have been used to decorate a piano, similar in style to that in **Fig. 74** (1826) with pleated front, probably of silk. However by 1825, there is evidence that compo mouldings were being removed, as the following entry for P. Brown Esq^{re} from the day book of Holland & Sons shows, revealing that compo had previously (originally) been used on the piece in question. The reason for their replacement is felt to be their lack of durability:

> Make a new Crimson Silk Curtain with drapery for piano forte front new tufting for fringe w^{t} [illegible] new silk fringe complete. Tak^{g} off Compo Gilt mold^{g} & fix^{g} new brass figur'd ornamental mold^{g} & brass ornaments on the top & Bottom front repair^{g} repolishing fix^{g} Brass knobs on front of door... (£5 10s) [72, p. 198]

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[34] See Appendix III.
[35] For further discussion of cost see Chapter Five.

According to the entry of November 1805 in the Jackson accounts, Saunders was also updating old carved frames with compo ornament bought from Jackson's. There is much object-based evidence for the use of compo to "modernise" frames around this time and bring them into line with the early nineteenth century environment in which they hung. For example, the frame surrounding *The Linley Sisters*, *c.*1772, by Thomas Gainsborough (1722-88), **Fig. 75**. This frame with fluted frieze is of neoclassical type, dating to between 1770 and 1800, after which time the cavetto or scoop profile became more popular. The sight and top edge are a beautifully carved ribbon and stick, though the back edge ornament is moulded and this may be true of the beading. The simple acanthus corners (in compo) are visible beneath the later Regency acanthus additions (**Fig. 76**). The first leaves are probably original and suggest that compo had been used on frames before the Regency, but they do not indicate more than this.

Although, like the previous example, bands of moulding material have been noted on frames whose ornament is predominantly carved, the idea that the object may represent a "transitional period" when the trade was making the change from carving to compo does not seem an adequate explanation. If it was expedient to cast one band of ornament then why carve another? One reason would be the relative vulnerability of ornament on different parts of the object illustrated by the mirror in **Fig. 77** (very similar in style to a design by George Smith from 1808 in **Fig. 78**). Here only the small paterae within the scotia are compo. The frame surrounding Hoppner's portrait of the young Prince of Wales (*c.*1792) is similar in this way. It was commissioned for the painting by the 3rd Marquis from John Smith *c.* 1813 [14]. However in this case, the corners (and scotia) are made of compo (**Fig. 79**) while the crown and feathers are carved (**Fig. 80**). This also indicates that carving skills were available within the firm of John Smith.

Other entries in the Jackson day book provide further detailed information about the nature and scale of subcontracting. For example, Eckford's operations during the early years of trading show that his frames were also made by Jackson's.

1815 Mr Eckford Wat^{n} Lane
Nov 25 Making 1 (?) frame witing Chequing, Ornamenting & Sweep

	& Cutting through D°	£1, 2s
Dec 6	Making 2 frames 20ft of 5 $^{1}/_{4}$ in	£1, 10s
	Witing D°	£_, 13s, 4d
	Chequing D°	£_, 9s
	Ornament^{g} Sweeping & Cutting through Do 16 Holes	£3, 2s
	Making 2 D° 19 ft of 5 ¼ m	£1, 9s
	Witing D°	£_, 13s
	Chequing D°	£_, 9s
	Ornamenting, Sweeping & Cutting throug D° in 16 places	£3, 2s
	Mak^{g} 1 frame 6 ft 9 of 4 in (*m*?)	£_, 6s, 9d
	Witing D°	£_, 3s, 4d
	Chequing D°	£_, 3s, _d
	Ornamenting Sweep^{g}, & Cutting D° through in 24 places	£1, 2s
	Mak^{g} 1 frame 6 ft of D°	£_, 6s
	Witing D°	£_, 3s
	Chequing D°	£_, 2s, 6d
	Ornamenting Sweep^{g} & Cutting D° through in 24 places	£1, _, _
		£15, 15, 11
	Discount for money Paid	15s

[71, p. 191]

Clearly, Jackson's completed all the work bar the gilding. For example, "ornamentg" refers to the application of ornament; "sweeping" meaning the cutting of the curves for a sweep sided frame; "witing" is self explanatory; "cutting through" refers to the piercing of the ornament in frames such as that surrounding the Turners' from 1831 in **Figs. 81** & **82**, and finally "chequing", refers to the creation of a cross-hatch pattern in the gesso (still effected by hand with a langue du chat, carving flute or similar implement at this time). As a frame-maker, Eckford's involvement seems largely to have been retail, buying frames wholesale from Jackson's and providing the desired finish.

In addition to revealing much about the style of frames at this time, this extract also indicates the extent of Jackson's frame-making enterprise. The ledger shows that frame-making accounted for the majority of their operations (perhaps 95 percent) by

the 1810s and this is further underlined by other entries in the ledger.[36]

The large quantities of individual design elements on order from Jackson's are evident from entries like that for Green, below:

1817	Mr Green from 260	
Nov^{r}		
3	25 ft of Fisher Strap	1s, 6d
	25 ft 3 ^{in} Old French leaf	6s(1?)
10	8 Pateras	_, 6d
	2 D^{o}	_, 6d
	3 Roman Bands	1s, 6d
14	1 Set Smarts top Corners & turets	2s, 8d
	1 Set leaders Corners & foliages	4s
15	_ 4ft laurel	_, 2d
18	7 Roman Bands	4s
22	1 Set corners & turets	2s, 6d
26	_ Cheq & frame	2s
Dec^{r}	1 Set top Corners & turets	2s, 6d
3	6 ft Poppy	_
	25 ft of Bubble	1s
	2 Sets of Leader Corners & fan foliage	8s
	4 Pateras	_, 2d
	Carried to 263	

[71, p. 251]

Compared to the way Eckford's business operated, Green is at least making the frames/objects using Jackson's compo design elements. However, if these ready-made designs could be purchased wholesale and direct from their actual producers, then why were they bought from a rival producer? There is at least one explanation. It is reasonable that Jackson's bought in a large quantity of different ornaments from other leading producers to supplement their own stock of designs. Recalling technical evidence, these ornaments, if not long runs of decoration already applied to wooden mouldings and therefore *dry*, would have a shelf life of about three weeks if wrapped to retain their moisture and thus their plastic qualities. The types of "free" ornament

[36] See Appendix III.

that would be directly applied to the curved profiles of frames were generally centre and corner motifs, these forming the greatest variants or the elements in the design vocabulary whereby the maker could best "customise" the basic frame. Therefore, it is no surprise to find that it is usually these elements that bear the names of other producers within both ledgers. Thus if Jackson's bought more than they may have immediately required it would have been in their interest to get rid of them, though it is not known whether they were sold off at a profit, more cheaply, or for the same price. As a result it would be much easier to purchase a quantity of designs from a secondary source when available, regardless of their original source. If these designs were cheaper from a secondary source, it would have encouraging this practice.

It would hardly be cost effective to carve a mould of the same designs as others for their own production when they could purchase them cheaply enough elsewhere. Economically, it would generally only be worth carving new moulds for new and innovative designs, unique to a particular manufacturer at the time of carving. It is thus possible to define mould collections more clearly. This practice indicates that original collections of moulds from the same firm (excepting those collections that were subsequently bought up to augment collections) had a certain quantity of unique design elements particular to that collection. Therefore, the fact that firms bought up the collections of others when they ceased trading could only have obscured these important details that may, with further research, lead to the positive matching of mould pattern with object and maker.

It is likely that the order from Green formed only a part of the extra stock he ordered from fellow tradesmen and that his own accounts read something like Jackson's at this time. Looking closely at Jackson's day book, the quantity of stock purchased from others forms perhaps no more than fifteen per cent of their goods supplied as a rough estimate. It is clear that the same names occur time and again. Finding them in two ledgers of the same period indicates that there were a number of key producers from whom allied trades purchased goods in various stages of completion according to the nature of their operations, whether it be frames or architecture, wholesale or retail. The scale of operations suggests that the majority of those who advertised as carvers and gilders were not involved in carving at all but with the purchasing/production of compo ornament. This very fact that they did not advertise as compo makers suggests

an early prejudice.

It has been indicated that George Leader, a leading carver, was involved in both the carving of moulds and the production of compo ornament. However a short entry in Jackson's account book suggests that he had his frames made either some, or all of the time, despite having the expertise to make his own. Logically there would be no need to do this if Jackson's could make the frame "Compleat" for a competitive price.[37] Whether he was involved in retailing the finished (gilded) objects is still uncertain but this is one explanation:

1816	Mr Leader	
March	Makg 1 frame 23 ft of 9 ½ Bold m	£4, 6s, 3d
29	Sweeping & Ornamenting D° Compleat	£5, 10s, _
		£9, 16s, 3d

[71, p. 226]

The involvement of tradesmen like Leader indicate that the production of compo ornament formed a major part of ornament production within the carving and gilding trade and at a high level. There is further evidence of this in the following entry, again from Jackson's account book:

1812	Mess Nash & Co Dover St.		
Sept[r] 17			
	148 ft Roman leaf oge @ 5 (4? d? probably inches)		£3, 1, 4d
	186 ft Rafle leaf oge @ 3		£2, 6, 6d
	126 ft Rose leaf oge and square 2 ½		£1, 6, 6d
	250 ft Beads 1/2		£_, 10s, 4d
	12 ft Acorn Ovolo 2		£_, 2s, _
	4 Lions Heads		£_, 1s, _
		Paid	£7, 7, 9

[71, p. 22]

This order from John Nash clearly demonstrates the volume of work that could now

[37] See also Chapter Six.

be produced in relation to entries for carved ornament and again, only Jackson's own ornament is mentioned as the architectural nature of the order might suggest. This rare entry within the ledger indicates that the architectural use of compo was present but frame-making took precedence at this date, (if this entry means that there was no separate account book for architectural orders). However, there is evidence that very similar or identical design elements to those listed in picture frame orders were used architecturally. For example, the 1817 entry for Green cites "6 ft Poppy". A band ornament (in compo) known as poppy, but which is actually a band of poppy seed cases can be seen in the cornice in **Fig. 83** and can be dated to the mid 1790s.[38]

All these entries reveal the high level of Jackson's expertise as compo manufacturer and frame maker. The fact that they were able to produce large swept frames, with many pierced areas indicates a certain degree of skill and that these objects, although batch produced, were still individually crafted. This is underlined by the 1805 entry for "M Jackson Father" with evidence of carving skills within the workshop at this early period.

In confirmation of the above evidence, Charles Tomlinson notes that by 1858 no significant changes had been made to the early nineteenth century trade structure; many firms who called themselves "carvers and gilders" were not involved in carving or indeed, compo production. They either made the basic frame, bought the designs and gilded it, or bought it complete and ready to gild:

> The gilder ... has no choice but to purchase his ornaments *ready made* [my italics], and attach them to a plain frame, or to purchase the frame already ornamented in the rough, and finish it by gilding [48, p. 52].

However, large firms like that of Charles Nosotti were involved in every stage of production from carving the moulds to retailing the finished objects at their Oxford

[38] This cornice is in the dining room of Storrs Hall on Lake Windermere. The house was built in the mid 1790s by the eminent architect and architectural perspectivist, Joseph Michael Gandy (1771-1843) for Sir John Legard. The dining room represents the first phase of work carried out there, though there are other architectural examples of compo within the house that can be dated to the 1810s. See also Goodall & Richardson [73].

Street shop in the 1860s [37, pp. 203-5].[39] They still produced compo ornament by traditional methods and the customer could have a design of his own made up on request: "Mr. Nossotti's artists will execute for you any design you choose-a medallion of your own features if you wish it." Thomas Wilkinson Wallis also indicates how the production of moulds could exist both outside and within the trade: "I carved some moulds for myself, to start with in business, or the trade" [40, p. 57].

In the early 1860s Binning's London frame-making business was producing a variety of small objects including frames, semi-finished to the trade: "Upholsterers & the Trade Supplied with Work in any State" (**Fig. 84**).[40] Like today, the retail sector was not really catered for by certain businesses who operated from a workshop without shop front. However, the fact that customer requirements were catered for is clear from the wide choice of end product.

To place machinery for compo in greater perspective within the organisation of production, it is worth comparing it to parallel models such as wood carving machinery. Although developments began principally in the early nineteenth century, it was not until the 1840s, that true carving machines were finally developed in conjunction with the fashion for elaborate carving at that time. Compared to the patent machinery for use with compo and plastic moulding materials, carving machines pre-dated them by about ten years. There may be several reasons for the late appearance (late 1860s) of the majority of patent machines for use with compo. The workforce, resistant to machinery, may also have feared that the market would be flooded with cheap machine-made goods. Equally, evidence suggests that traditional manual skills were more than adequate for demand, even up to the late 1860s. By this time, and in contrast to machine carving applications of the 1840s, the demand for affordable frames enjoyed steady growth with the introduction of new printing processes, not least the photograph.

Edwards suggests that the long period of introduction of the true carving machine may be a fulfilment of the "momentum model" which states that technological innovation

[39] This firm is gradually seen to expand its premises from the 1830s through to the 1880s. See Appendix I.
[40] See Appendix I.

is entirely dependent on a set of favourable social and economic factors [74, p. 75; 75]. This model fits the introduction of carving machines in that early technology (pre 1840) was limited to ship building, and even when machinery had been in use for a number of decades, it was not readily accepted until the end of the century. Such technology may also have met resistance from masters in the furniture trade in the first half of the century, fearing loss of control if work could be mass produced far more cheaply. The initial expense of purchasing the machinery would further have dissuaded them.

However, machine carving was a completely different process to the stamping or impressing commonly employed for moulding materials [74, 76]. The Patent Wood Carving Company was the exception, producing simulations of carving by "burning" an impression into the wood with a heated metal die under pressure. Despite differences, the methods of the two main companies (Irving/Pratt and Taylor/Williams/Jordan) were very similar in that they employed a tracer that followed the contours of a model and steam powered cutting tools copied the shapes onto a piece of wood. The Jordan method was more expedient, producing up to eight copies at once (the wood to be carved was moved on the bed of the machine, enabling this) and the Irving/Pratt method only one. Although these machines used through the 1840s, `50s and `60s were all patented and received a considerable amount of publicity, (some more than others), in real terms their application was far more limited for a number of key reasons further to those stated above.

The machinery required an extremely large workshop and was complex to use. It took some skill and time to set up a machine for a particular task making it uneconomical to undertake small, individual jobs. These early machines must also have been prone to break down, halting production. As a result, production was largely confined to long runs of repetitive mouldings that were supplied by the manufacturers to furniture makers and applied as needed. Very large commissions were also more common. The fact that the processes required a considerable degree of finishing was a further problem. These machines only roughed out the shape and further hand carving was required to finish the mouldings. This undoubtedly added to costs, though there are varying reports of what those actually were. For example, Jordan's claimed as much as a sixty-percent saving in order to win the contract for the

new Palace of Westminster (1845) but by 1846 the actual saving was only six-percent [74]. Furthermore, this large contract is reported to have involved five machines and over three-hundred men.

The compo trade on the other hand, consisted of perhaps no more than a dozen specialist manufacturers at any time, and many more smaller producers in London.[41] It is likely that only the largest compo producers would invest in specialist machinery, particularly as their workshop could accommodate it. However, by the late 1830s and 1840s there was suddenly a wider selection of serious rival materials as these larger producers were involved in the production of ornament from papier mâché and carton pierre. Picture frames became only a small part of their repertoire, though compo was still the most suitable material for relatively small-scale work like this at this stage. This may account for the earlier appearance of machinery devoted to moulding "pulp" and not specific to compo or picture frames.

Unlike carving machines, pressing machines for the picture frame trade did not require substantial specialist skills and many hands to operate them. A number of machine patentees are listed under "gilt ornament manufacturers" in London trade directories from the 1860s; for example, A. C. Engert and Company.[42] However these names do not correspond with those listed as compo makers before these manufacturers begin to appear, so clearly machine production was quite separate from the outset. In addition, the coating or finish eventually became part of the mechanisation process, suggested by the presence of "gilt" ornament makers. Though beyond the scope of this thesis, this is an important point because it marks the juncture at which not only were carvers under threat but also the gilders.[43]

Certainly, these machines were excellent labour saving devices as regards the main section of a frame and could do the work of many tradesmen skilled in the manual production of the same component in a fraction of the time, cutting labour costs.

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[41] This estimate is derived from those firms who advertised in London trade directories. As there seems to have been such fierce competition between machine specialists, it seems unlikely that many of them could have survived without advertising. They could not be reliant on the long-standing reputation of certain traditional firms.
[42] See Appendix I.
[43] A detailed survey of photographic frames would reveal information in this area. See the Ph.D. thesis of Magdalena Kozera (V&A/RCA Conservation Course).

However it is to be remembered that they could only produce bands of ornament and there is no evidence for more complex corner elements for example. As these would have required further expensive dies and it was possible to do without them, they are absent in most machined examples.[44] Therefore it would have been just as economical to cast such elements with the screw press. As the press and the moulds to create anything more elaborate were part of the traditional workshop, it makes sense that the sites of machine and manual production were largely separate from the outset.

Therefore if machined examples exhibit additional enrichments such as corners it is more likely the main machined components of the frame were bought in from a machine dedicated supplier and the decoration finished in a traditional workshop, like the "Millais" frame **Fig. 46** (although Morell's are known to have produced separate corner motifs). It is not clear how much of the machine manufacturer's work was supplied to the trade, but the appearance of known machine manufacturers under "carving, gilding and picture frame making" in London trade directories suggests further levels of production and retail in a number of cases.

The "whatnot" in **Fig. 85**, and illustrated in the Alfred Goslett catalogue (1888) (**Fig. 87**) demonstrates how a basic frame and shelf with essential compo decoration was probably batch produced by one firm. These were then customised with further compo elements by another company for either wholesale or retail. In this instance, Goslett themselves may have been responsible for the basic form and the glass because the design in **Fig. 88** does not feature in their catalogue but again the form and basic ornament are the same. This style is also noted in Morell's catalogue (**Fig. 89**) and they too may have been the source. It is not clear whether machinery was involved in production here and examination of the Goslett example favours hand production. However these examples do illustrate the extent to which a product had been standardised in the late nineteenth century, even on manually produced items that were now facing competition from machines.

[44] It is not known how much a die for a machine cost, but certain sources mention the relative expense of metal dies for stamping wood [76]. Their high cost compared to the continued use of existing stocks of traditional moulds may indeed have contributed to the endurance of the latter.

Therefore, just as the trade in machine carving kept carvers employed in the finishing process, machines for compo were more limited than expected. Essentially though, the machine manufacturer had taken over the entire production of long bands of ornament, a process that was previously shared between traditional compo producers large and small, and the wooden moulding manufacturers in the first half of the nineteenth century. Machines therefore superseded the previous processes for all but the more expensive frames that were still produced in the early nineteenth century, largely handcrafted tradition.

The early twentieth century trade catalogue of large moulding manufacturers such as Morell's, indicate that their output generally consisted of runs of low relief moulded ornament, easily produced with the machines of the day in a dedicated factory. Such firms were competing with a number of firms importing batch produced mouldings, probably of German origin. These cheaper mouldings, often plain with simulated gold finish are noted a number of sources from the 1860s and 1870s [33, pp. 16-18].

The effect of imports are difficult to gauge, but firms like Bourlet indicate that handmade frames continued to be hand-made after the turn of century, supplying the more expensive, specialist end of the market (**Fig. 90**), but that machined mouldings had flooded the middle and lower end of the market. For example, the label on the "Morell" photograph frame shows that the frame was made up by the frame-maker C. Allen of Reading, some time before 1903, using Morell's mouldings (almost certainly Morell's pattern) **Fig. 91**. The fact that such a frame can still be found indicates the wide spread production and use of machine mouldings from leading manufacturers.

Although the application of the machine in the compo workshop has some parallels with the machine carving trade (on the whole it accelerated manual procedures) there are some notable differences. Unlike wood, compo was ideal for use with machines because it required hardly any labour to create the optimum surface. However the patents indicate that it was not until nearly the end of the century that mechanisation for compo was truly efficient. The process for compo was really an accelerated version of the manual process. The die was essentially the same as a traditional

mould, usually in roller form, that was rolled over or stamped into the compo in just the same way as if the material was subject to the screw press. The real difference was the type of power that drove the machinery. Machine carving, on the other hand, was merely a simulation of carving. Although a series of rotating cutters could be angled to remove the same quantity of material and in the same place as a hand carver, they were not removing it in the same way. Therefore the carving machine could never replicate the characteristics of a dynamic piece of hand carving produced by the wide range of chisels, each suited to specific tasks. Of course one procedure was moulded in both its traditional and mechanised form and the other was not.

Summary/Discussion

- Jackson's early involvement with the frame-making industry lends weight to a connection with the Thomas Jackson, oval frame turner and the origins of batch production in frame-making. The Westwood's Birmingham trade sheet presents more convincing evidence that early production may have been outside London and within the button making trade. The trade sheet and patent both show that this trade was connected with turning and that the Westwood's were involved in the production of a wide range of ornament for different purposes.

  The fact that no primary evidence was able to confirm Jackson's as the first major producers in this country is corroborated by the lack of evidence within the Adam examples. This may seem surprising, particularly when Adam's work is synonymous with a repetitive design vocabulary. However carving was clearly the prevailing means of creating fine repeat patterns at this time. Furthermore, the type of moulding materials found, were also commonly used in the 1760s, `70s and `80s.

- Although evidence suggests that the production of compo first occurred on a broader architectural scale, (most particularly from the Westwood trade sheet) the Jackson account book indicates that frame-making formed a large proportion of the compo making industry by the early nineteenth century. This is further substantiated by the Smith day book. The possibility that large producers had

been supplying a broader architectural market, perhaps at a slightly earlier date, is suggested by the few architectural entries in the Jackson accounts.

- Although the Jackson account book may at first appear to suggest a possible "transition" period from carving to compo in the first year of the ledger (1805), the possibility that the entries refer to carved moulds for compo is favoured. This substantiates documentary evidence of a London ornament industry primarily geared to compo with very few skilled carvers, and that the change in the trade had occurred some years before. The customer accounts of William Saunders also seem to corroborate this, as does object based evidence.

- The Jackson ledger in particular indicates that probably a great many carving, gilding and frame-making businesses were actually just involved with composition production. Of those firms who advertised as frame-makers, some of them, like Eckford, were not even making the basic frame structure, proving that subcontracting was widespread on many levels. The nature of subcontracting here is very specific and the ledgers show that it was a direct result of the unique physical characteristics of compo. The very fact that it had a shelf life when carefully stored, and remained flexible for a period of time are precisely the qualities that enabled a multi-layered trade with different stages of production to exist at all. This gave producers and consumers flexibility of choice that must contribute substantially to the success of compo in the early years. Indication that work was subcontracted in spite of the skills being available (for example, Leader) suggests the volume of work within the trade at this time.

- Evidence further informs production techniques. Clearly it was recognised that a frame was made up from a variety of designs from different makers in the early nineteenth century. Although the ornament was now batch produced, frames were still made very much on an individual basis and at a high level, indeed largely replacing carved frames.

The above evidence is key to how the industry established itself.

- In the second half of the nineteenth century, although machines could physically have existed within a partially manual workshop, it is certain that a further machine based level of production existed, resulting in another hybrid object (usually the picture frame) that exhibited both forms of labour. As techniques developed towards the end of the century, more purely mechanised examples began to appear and smaller producers like Binning, remained dedicated to manual production, resulting in the gradual demise of many. On the other hand, machine manufacturers like Morell's clearly enjoyed a number of decades of success around the turn of the century.

In contrast to machine carving, the fact that a very large, skilled workforce was not required meant that labour costs would have been comparatively low. This, combined with an application, predominantly in frame mouldings ensured that "compo" enjoyed considerable success under machinery.

Chapter Four: Production Levels

Introduction

- In accordance with the production-based theme of the previous chapter, this chapter examines the compo trade through an assessment of production levels and how these changed over time. Data is predominantly based on the number of firms listed in London trade directories. These provide a guide to the nature of business and the scale of demand for composition, particularly in the first few decades of the nineteenth century, but it is a guide only. Fluctuations over time may connect with manufacturing evidence or may indicate a completely different set of trends. Without an extremely rigorous survey of individuals, it is difficult to quantify how many compo makers there were among those who called themselves carvers, gilders, frame-makers and others (1813):

  > Of about 150 persons, who call themselves carvers and gilders, the greatest number are gilders only ... [many] never saw a carving tool in their lives [39, p. 556].

- Surviving trade cards and knowledge of individuals makers gained through broader research help to overcome some of the anomalies but of course as the trade cards were originally dated through the directories, the oldest card coincides with the date at which makers are first observed. Nevertheless, the addresses on the cards accord with the earliest directory records, some of which changed quite regularly.

- More specific corroborative evidence, without the anomalies presented by the directories, is again provided by the Jackson customer account book.[1] One obvious problem with using trade directories is that many businesses did not use them at all, or if they did, often missed a couple of years although they were still trading. In addition, information was not always up-to-date for the particular year of publishing.

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[1] Other studies which have made extensive use of trade directories as evidence include: Ponsonby [77]. Again, day books are used effectively to corroborate this and other forms of problematic evidence, but it is noted that the detailed nature of such evidence and its central position in the research "has inevitably meant that this study has been wholly concerned with very particular circumstances." See also Ponsonby [78].

- To provide some consistency to analysis, the graph is based on the number of compo makers/manufacturers listed and not on the number of specialist firms or "gilt moulding manufacturers". Their numbers, in any one year, after about 1865 do not usually exceed more than a dozen for London directories, and their inclusion within the graph would augment the picture post 1865. Of course a number of these manufacturers also advertised as compo makers and they are therefore included in the assessment. Likewise the merger of companies might reduce advertising numbers but not production levels.

- There is an additional problem for most of the directories pre-dating about 1824, because listings are by name and not trade, requiring either an existing knowledge of makers or a complete review of every page of the directories.[2] Data for certain years has been included in the nearest five-year increment, for example the first appearance of makers is 1784, though the graph shows 1785.[3]

- It is important that advertising levels are not too clearly equated with production levels. This is particularly true with the advent of machine manufacturers in the late 1860s, when increased competition might encourage businesses to advertise. A fall in demand and therefore sales would also generate the need to advertise.

  Nevertheless, the graph works on the basis that there is consistency to these anomalies.

[2] The latter has been carried out for select years and a combination of both methods has been applied to extract as much information as possible.
[3] See Appendix I.

The Evidence

Fig. 92 shows a graph illustrating the numbers of composition ornament makers found in a wide spectrum of London directories between 1770 and 1940.[4] It shows that wide-scale production began in the early 1780s and reached a moderate level fairly rapidly, i.e. within a year or so. However, there is a significant drop in production, coinciding with the French wars where 1810 represents the low point. The following five-year increment shows an increase once again. This accords with evidence from Jackson's customer accounts, where there are no entries between 1806 and 1811 but a marked escalation in production between these years; for example, on the 9th November (1805), only one (carved) raffle leaf and one shell is recorded. This contrasts with more than six-hundred feet of compo ornament supplied to Nash on the 17th September, 1812.[5]

The wider economic climate at this time reveals that the 1780s were a period of crisis in Western Europe, due in part to a cycle of bad weather that brought poor harvests (1782-7). This followed half a century of rising prices and falling wages. During this period of world depression in commerce and industry, many employers were forced to cut their workforces and those who remained in employment struggled as real wages declined [79, pp. 142-4]. The graph in **Fig. 93**, (although also related to crime statistics) shows the marked escalation in prices in England at a time corresponding to the first appearance of compo within trade directories (and the earliest surviving trade cards). This graph also shows how prices fell following the wars of the French Revolution. Again, prices fell sharply from 1813 and it was not until the 1820s that they finally stabilised and full economic recovery really began [79, pp. 146, 156].

A climate in which skilled labour was relatively inexpensive as a result of a decline in real wages and the sudden escalation in prices, particularly for basic food stuffs, meant that the carver would find it increasingly difficult to survive. This may account, in part, for the development of an alternative material in the early 1780s, particularly if the carver could charge a relatively high price for compo ornament that cost him comparatively little in terms of time and materials to produce. The compo

[4] Not all the various London directories consulted contained extensive data and this was particularly true for certain years (see Appendix I). Although this does not provide a national view, London was by far the main site of production.

makers' graph also indicates that recovery by 1815 is a little earlier than wider trends suggest. The evidence of Jackson's customer accounts and their new Rathbone Place premises in 1815 also suggest that production was increasing. Again this is supported by evidence that there were "only eleven master carvers in London, and about sixty journeymen (though at one time there were six hundred)" [39, p.556]. Without this evidence, the initial success of compo could also be explained by the need for advertising a "new" product and a subsequent initiative following the wars with France.

By 1825, the graph reaches a peak and then tails off to 1840. 1825 is just before large interior schemes in compo such as the Waterloo Gallery at Apsley House (1828) and the very wide profile picture frame was at the height of its popularity. The decline in the graph at this point concurs with the appearance of materials such as carton pierre, the sudden advertising of "improved" papier mâché, the introduction of carving machines and the mechanisation of veneering. Again, if related to any competition that may have been generated by these materials and techniques, a rise in advertising during the 1840s would be expected from compo producers. However if there was a strong demand for all types of relief ornament at this time, bursts in the continual development of materials may not have affected compo production to the point where producers felt the need to advertise.

1850 shows a major increase on the graph and a continued increase in smaller but steady steps reaching an all time high in about 1865. It is possible that a part of this apparent development was due to the mechanisation of the industry during this period (as a result of the increased demand for frames with new printing methods), bearing in mind that the first signs of change are noted in the patents of the 1840s. Again, with mechanisation came increased competition for existing producers, and thus the need to advertise.

As the bulk of machinery patents for frames, occur after 1865, it may be that earlier developments account in part for the rapid rise of the graph in around 1850. On the other hand, evidence has shown that demand for frames, at least by the 1860s was

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[5] See Appendix III.

quite genuine and related to demand for goods from a broader middle market. The increase in the graph at this point may therefore indicate the attempts of existing traditional producers to meet that demand (at least in advertising terms, if not in actual production), immediately before machine producers were able to take a share of that market.

It is not known how many feet of moulding could be produced per minute for example, but as many of these machines were steam-driven, even a small number of manufacturers could easily have produced vast quantities. The use of steam power also provides a guide to the size of a particular firm's operations. For example the firm of Holland is said to have installed a steam engine in 1855 at a cost of £1250, putting this level of mechanisation out of the reach of most small firms, at least during the 1850s and 1860s) [49, chapter VIII, note 30, p. 115; 80, pp. 310-11; 81, p. 40].

Into the early 1870s, there is a rather dramatic decline in the graph when an increase in advertising from existing manufacturers might otherwise be expected in the face of competition. This decline levels out around the turn of the century, only to rise again, corresponding with the mass machine-made output of firms such as Morell's. The cessation of patented machinery for frames towards the end of the century corresponds to increased levels of advertising, indicating the stabilising of demand into the twentieth century.

Without examining the highly complex underlying reasons, the Victorian era was generally a period of economic equilibrium in which both money and real wages for most workers rose, and prices, although subject to fluctuation, remained within a fixed range right to the end of the century with the notable exception of the world depression of 1873 (**Fig. 94**) [79, pp. 156-9]. It is possible therefore that the panic of 1873 which saw rural trouble and unrest throughout Europe and America contributed in a more significant way to the apparent and dramatic fall in advertising noted in the compo makers' graph at this time, followed by a slow but steady recovery.

Summary of Fluctuations

- Wider trends show that the economic crisis during the 1780s was ideal in many ways for the production of compo. This is in line with advertising evidence for the first batch production of compo on any scale in the early 1780s.

- The subsequent decline in the graph through the French wars suggests that demand had genuinely fallen away and wider trends support general hardship at this time. However recovery came slightly earlier than suggested by the economic context.

- An increase in advertising during the 1820s may reflect the new economic stability and a response to demand. On the other hand an increase in demand would lessen the need to advertise, so this fluctuation cannot easily be accounted for. Certainly, the number of compo frames to have survived from this period suggests that demand was still strong.

- The decrease in advertising during the 1830s and `40s is a little surprising, where an increase might be expected if there was serious competition from alternative materials. However the development of these materials was partly a response to demand for architectural cast ornament (particularly ornament with undercuts), and demand may have reduced the need to advertise. The lack of advertising among compo producers may therefore suggest the enduring demand for compo frames. It is to be remembered that a number of the larger manufacturers represented in the graph were now producing ornament from other materials and compo and frames were becoming a smaller part of their output. A further explanation may be the merger of businesses.[6]

- The increase in advertising levels into the mid 1860s comes at a period of relative economic stability. There is little doubt that existing producers were responding to a genuine demand for picture frames at this time. Again, to some extent the data will also reflect advertising other goods from different materials.

[6] The subject of further research.

- The marked decline of the graph into the 1870s is unexpected in the light of competition from machine manufacturers at this point. Either demand was so great at this point that the need to reinforce a presence only remained mandatory among the relatively new machine manufacturers, or many existing producers had ceased trading with the advent of the machine. The depression of 1873 may also be a significant factor in diminishing numbers here.

Despite notable limitations, the graph largely conforms to wider economic trends. The economic climate of the 1780s lends weight to evidence that compo was first batch produced at that time and not earlier. In general, the graph provides further defence of evidence presented within this body of research, that demand continued to grow throughout the nineteenth century. This demand lessened the need to advertise in the 1830s and `40s when materials such carton pierre appear, and papier mâché was again prominent, but with the introduction of machinery from rival producers in the 1860s, an increase in advertising is expected. The following chapters help to throw light onto some of the anomalies.

Chapter Five: Cost Analysis

Introduction

- In 1819, compo was said to be eighty percent cheaper than carving [38, p. 556]. The following text will consider the validity of this dramatic price differential over time.

- One of the points that this section seeks to explore is the extent to which the relative economy of compo was transferred to the consumer, how this may have changed and some of the reasons for those changes.

- An understanding of cost is essential to an assessment of whether composition goods were really available to consumers at the lower end of the market, and thus key to its re-evaluation as a poor quality, low cost material.

- A comparison of carved and compo frames is highly subjective and the available information has limitations given the complex nature of sources. For example, prices that relate directly to both surviving carved and compo objects of a similar date and like nature are rare. It is therefore often necessary to compensate for differences, dependent on whether those differences are in date and therefore value, or the size and decoration on the object in question. The evidence presented within this section takes into account these problems.

- Again, the Jackson customer account book is an excellent source, providing evidence of woodcarving costs (albeit intaglio carving), of key importance for the purposes of comparison. Once more, the weighting of evidence is concentrated in the early nineteenth century, primarily because the most valuable sources of information to have survived are the ledgers.

- Evidence from around the middle and second part of the nineteenth century is largely reliant on marketing material. This is because there is a dearth of early documentation in accordance with the scarcity of early catalogues. Evidence from

the 1850s and `60s is also rather limited though a great many compo frames were produced during this period. Either few catalogues were produced, very few have survived or indeed both. *The Art Union* is an informative source as are some of the trade catalogues referred to in the following section.

The evidence

From Jackson's ledger we can analyse the cost of reverse carving individual designs (moulds) in 1805. The cost of carving a "Corner Husk" is priced at 4s. (A "Shell" cost 10s; a "Raffle leaf" 3/6 and "2 Lenths [sic] of Flowers" 12s). By 1817, "2lbs of Composition [and] 4 Smarts large husks" 2/4.[1] If there was any doubt about whether these last elements were compo casts, this is confirmed by the cost.

A brief calculation gives an approximate price percentage of compo to reverse carving, (assuming that the husks of this entry are similar to that from 1805). The 1817 entry prices 2lb of composition at 1s, therefore 4 of Smarts large husks cost 1/4 and one at 4d. Statistics show that although there was some fluctuation in the value of the pound between 1805 and 1817, values ultimately remained the same.[2] Therefore a single compo husk in 1817 was as much as 1200 percent cheaper than its reverse carved equivalent. (Four compo husks were 400 percent cheaper than the one reverse carved example). These are trade prices and this margin was further eroded in the production process (considered shortly). However carving in reverse would certainly have been more expensive than relief carving, so the difference here is inflated.

Previous discussion has noted the carving of another mould in the entry from 1812-13 for "1 Gothic Patterns to Shew 2 faces" and this work is priced at 5s. Although there is an identical order for the following day, this does not confirm that the mould took one day to carve. However, a skilled carver could probably carve a mould like that in **Fig. 36** (on both faces) in one day. A rough estimate is that a mould could take anything from an hour or two to a couple of days for the most complex designs in skilled hands. If a carver worked 6 days per week, he might produce, on average, about 8 moulds, which would bring a weekly wage of £2 if each mould cost an average of 5s. Thomas Wilkinson Wallis also noted (probably mid century) that he

[1] See Appendix III.
[2] Equivalent contemporary values of the pound: historical series 1270-2000 (Bank of England).

could earn 7s per day for the moulds that he carved and sold to the trade [40, p. 57]. Unfortunately the number of moulds is not specified. Real wages increased between around 1812 and 1850, and although this increase does not seem very great, it is probably realistic. Indeed, 7s a day in 1850 was an extremely good wage for a skilled worker. Such high prices for moulds again support evidence for the limited use of machinery by the middle of the nineteenth century and that traditional moulds were still the essential tools of the trade.

Up to 1790, the average daily wage of a building craftsman (such as a mason) was about 24-29d and those working in cabinet-making and associated trades earned considerably more. A chair-carver for example could earn up to £4 a week where the daily wage of an unskilled labourer could be 22d, so a carver's wage (whatever the specialist application) was very good compared to other skilled professions.[3] However, the sharp deflation at the end of the eighteenth century, together with soaring prices and a decline in real wages, would provide tradesmen with a strong incentive to use a viable alternative to carved wood and to set up in the new compo trade. Furthermore, despite the adverse economic climate, the demand for goods at the higher end of the market which had given rise to a whole cluster of new inventions from the early 1770s continued to prevail or there would have been little or no incentive to look for cost effective alternatives.

The price of goods further along the production process is apparent from Eckford's entry (1815) which provides a breakdown of prices for the various stages of production. For example, "Makg [sic] 2 frames [from] 20 ft of 5 ¼ m (the width of the moulding)" cost £1 10s.[4] The "witing" cost a further 13s. 4d; "chequing", 9s. and finally "Ornamentg Sweeping & Cutting through D° 16 places" not surprisingly cost more at £3 2s.[5] Therefore the trade price of these two compo frames in the white was £5 7s 4d and thus £2 17s 2d for one.

By comparison, a carved (and gilded) frame from the ledger of Gillows of Lancaster

[3] The actual income of unskilled workers is difficult to quantity. See Burnett [57, pp. 180-1].
[4] The length specified here appears to be the total quantity of moulding required to make two frames. This provides an idea of their finished size. Therefore their longest edges measured between 2 and 3 feet which is in proportion with a wide profile of about 5 inches, fashionable during this period.

(1796) was charged at £1 3s 4d, but as the Eckford examples were about twice the size, there was little disparity in price [82].[6] The years between 1790 and 1800 saw quite a dramatic devaluation of the pound although it had recovered to quite a large extent by 1815-16.[7] This indicates that an elaborately decorated compo frame (in the white) cost approximately the same as a far plainer carved and gilded example of similar size,[8] although Gillows were supplying their frame direct to the customer and Jackson's to the trade. The cost of carving the elaborate ornament suggested by the sweep sided and pierced Eckford example would undoubtedly have been much greater. It is certain therefore that the production cost of compo design elements at the beginning of the nineteenth century was far cheaper than their carved counterparts than is suggested by contemporary sources, which might therefore be referring to the cost to the consumer.

Thomas Temple's involvement in the compo industry has been indicated in the Smith day book and examples of his frames were made for the Waterloo Gallery (1828) at Apsley House (**Fig. 95**). The Gallery is an early surviving example of Jackson's architectural compo work, and cost £400 as opposed to a reputed £2000 for carving.[9] This would place the saving to the consumer at 500 percent. If the total profit were as much as the 1200 percent (calculated for reverse carving) then the tradesman took just over half the total profit. The real figure is likely to have been less than this but perhaps not much less. It is likely that the tradesman kept at least half the profit for himself.

In the absence of a break down of costs for work at Apsley, an early surviving bill to a Mr. Lawrence from Jackson's, (described solely as "Composition Ornament Manufacturers" at this date, 1833) provides useful evidence (**Fig. 96**). The bill shows that a single patera cost 8d. The 1817 entry for a Mr. Green in the Jackson ledger

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[5] This included the compo designs for both frames, creating the swept sides and "piercing" the appropriate areas when dry.
[6] The carving and gilding for the Gillows example (carried out by John Ford over three and a half days) cost 14s at 4s a day. It is also to be remembered that prices were often considerably cheaper outside London.
[7] It was worth a few shillings less than in 1796.
[8] An example the same size as the "Eckford" would cost correspondingly more to gild.
[9] Endeavours were made to examine the bills of this room which are part of the private archive at Stratfield Saye of the present Duke of Wellington but without success (personal communication, Victoria Crake, Registry, Stratfield Saye). However, Alicia Robertson, Curator of Apsley House, was consulted and these figures are correct to the author's knowledge.

shows 4 paterae to have cost 2d and 8 were priced at 6d.[10] Although the size and design are not known, the increase in price is considerable and well above the rate of inflation. It is perhaps more realistic to consider the bill as a whole, and its total of £7 3s 5d is very similar to that for Messrs. Nash (1812) in the Jackson customer account book, which came to a £7 7s 9d. However the Nash entry cites moulding lengths of well over 100ft as opposed to lengths of 11ft to 21ft from the 1833 bill. This indicates a large price increase for compo ornament, despite the design of the mouldings and adjustments for inflation. It is thought that both these prices reflect wholesale costs.

In the absence of a price list for Jackson's 1839 catalogue, Eckford's trade sheet (**Fig. 97**) advertised in *The Art Union* of 1841 (**Fig. 98**), provides valuable evidence for picture frames, providing prices for the whole range. Compared to Eckford's 1815 examples (from the Jackson ledger) priced at £2, 17s, 2d, an 1841 frame of equivalent price measures 27 x 22 inches. Thus frames of this size in pattern nos. 5 and 8 from 1841, with swept sides of five-inch width, cost only £2, 2s. These examples were "Gilt with the best Leaf Gold warranted to clean". Indeed these were among the most expensive examples, and others of the same dimensions start at £1, 2s for pattern no.1.

There is at least one reasonable explanation for the fact that Eckford's frames came down in price over a period of twenty-five years. The Jackson ledger indicates that the styles were very similar. However, the earlier examples had numerous pierced areas of decoration and the trade sheet indicates that by 1841, Eckford was no longer providing this considerable extra refinement. This had to be done by hand and even with the development and use of sophisticated machinery such as the spindle moulder at the end of the century, such a procedure would require the use of special jigs and much manual input to guide the frame under the blade. Machinery can therefore be eliminated in this instance as a means of reducing price. Thus frames could be more competitively priced by reducing refinements. Examples matching these patterns show the quality could be reasonable and produced with traditional moulds, although ultimately quality was compromised (**Fig. 99 & 100**). These frame types were purchased in large quantities by collectors such as John Sheepshanks (1787-1863) and Richard Ellison (1788-1860) to frame their contemporary collections of oils and

[10] See Appendix III.

watercolours and were widely used at this time (**Fig. 101**). Certainly demand ensured competition which kept prices down, though these prices were still only within the reach of the upper-middle classes at this stage.

Other sources note the effect of new machinery for the production of wooden mouldings, on keeping prices down at this time:

...the advent of machine-made mouldings meant that mass-produced frames of meaner design could be sold very cheaply. In 1844 P. Garbanati advertised thirty by twenty-five inch frames of four-inch width for £1.6s, five-inch at £1.10s and six-inch at £2. Such prices were exceptionally low [1, p. 146].[11]

In fact, the prices provided here are close to those of Eckford three years earlier, and were probably very similar joined, compo and gilded frames. Indeed, their low prices were probably less exceptional than previously assumed. Again, despite the use of machines and lack of refinements, each object was still individually produced.

By 1847 there is further evidence that machinery was responsible for reducing the price of frames, but not those made of compo. The following description refers to machinery for "embossing" a pattern into softwood with a metal die:

... engravings have been deprived of an opportunity of effectively "doing their spiriting," from the circumstances of their being unframed, because the cost of a frame will be at least five or six times that of the print. ...The invention is that of Mr Bielefeld; and the result at which he arrives is a really good and ornamental frame at the lowest price (eight pence per foot), at which the meanest wooden shelter in which a work of Art ever found refuge can be manufactured. This is, as usual effected by machinery.

For many years there has been no improvement in the manufacture of frames; at least, none to render an acceptable frame accessible to limited means. The want has been a source of complaint, when so many of the most beautiful productions of the burin are no longer very costly. ...The results of this machinery will soon be – if it be not at this moment – such as to enable him who buys a print for a shilling, to place it in a worthy frame for another shilling – or very little more. And when we speak of a shilling print let no one suppose we allude to an inferior work [84, p. 35].

Cheaper frames for low cost prints had not really been available up to this point. So

[11] Source, [83, p. 146].

much so, that by the 1840s, a frame that cost as much or even a little more than its print was considered reasonable. This indicates that compo had not really been used for the cheapest form of framing, the print frame, to bring frame prices down. Again, this is because from the outset, it had been in the compo maker's interests to maximise his profit by producing expensive goods for the higher end of the market.[12] There is no doubt that cheap prints provided considerable impetus to frame-makers to mass-produce frames far more cheaply.

Bielefeld's machine "embossed" frames may have been able to cut costs because they not rely on a moulding material for their decoration, that would have constituted a considerable saving on bulk production. However was the price of 8s per foot as reasonable as *The Art Union* asserted? One of the cheapest of the Eckford's 1841 examples (six years previously)[13] was a nine by twelve-inch frame with a maximum five-inch width (No.1). This cost 14s gilded. A Bielefeld frame of the same size, (though his mouldings may not have been five-inches wide), comes to 2/4d. This really was incredibly reasonable. It is also important to take into account the fact that Bielefeld was a great self-publicist and often used *The Art Union* as a vehicle for promotion.

As there is a dearth of advertising for compo from the 1850s and `60s, there is little indication of price, particularly from manufacturers such as Jackson's whose 1865 catalogue makes no reference to compo [85]. However Cassell's provide evidence in reference to chimney-glasses for which "Very good ones indeed may be purchased for £5" [86, p. 126]. Although the materials employed are not indicated, the description seems to suggest rather than exclude compo: "One with a neat-patterned frame, gilt all round with scrolls at the bottom of the two sides". This example was probably very similar to the examples in **Fig. 102** (1888), though without the central ornament. Five pounds was really a considerable sum and certainly excluded all but the wealthier upper middle classes, although Cassell's do recommend that "it is better to sacrifice something else in the room, and expend the money on a good glass".

[12] Major changes in the production of the print occurred with the introduction of steel lithography in the 1820s.

The 1870s catalogue of Shoolbred indicates that compo was still being used, and the catalogue of Alfred Goslett and Co. (1888) provides more comprehensive information. For example, no. 1489 (in **Fig. 102**) is a carved example, priced at 93/6 (or 87/6 "old process")[14] whereas no. 1202, a compo example of very similar size and design was nearly a pound more at £5, 10s. For a sixty by forty-eight inch plate, no. 1432 (**Fig. 102**) in compo is also 93/6 or 87/6 for the "patent process" and again, for no. 1441 a carved example with the same sized plate is priced at 105s. The marginal price difference indicates that the carving may have been machine assisted. It also suggests that the type of material with which such goods were made was not a primary concern to the consumer; a point further discussed in the following chapter.

Summary

- Despite the difficulties of comparing like with like, early nineteenth century evidence indicates that within the trade, the compo ornament itself may have been as much as 1200 percent cheaper than carving to produce, though the real figure is probably slightly lower. The Gillow and Eckford comparison shows that there was little difference in the cost of a small plain carved example and an elaborate compo equivalent. However, the carved frame was produced direct for a customer, whereas the compo frame required gilding. Eckford himself would need to add his cut, making the compo frame ultimately more expensive (though more elaborate) at the point of sale.

- The compo producer took a large percentage (at least half) of the substantial profit that compo initially gave to him, which was further absorbed by selling within the trade. By the time the completed goods reached the customer, though cheaper than carving, they were still very expensive and remained only within the reach of the upper-middle classes. Nevertheless, the ledgers indicate that production was booming in the early nineteenth century, and compo frames and architectural schemes therefore represented value for money.

The enormous cost of carving meant that compo, although relatively cheap to

[13] Again, Bank of England Statistics show there to be no difference in the value of the pound for the years 1841 and 1847.
[14] The method of "silvering" the glass.

produce, was initially used on frames that were very much individually crafted high quality objects, precisely because this offered tradesmen a means by which they could minimise the transfer of their profits to the consumer. Even after compo had been in use for over fifty years, a frame that cost the same or a little more than a print was difficult to find. This counters the theory that compo was first used on the print frame because it was a cheap batch production material reserved for the cheapest frames.[15]

- The Jackson bill of 1833 indicates that compo prices rose above the rate of inflation suggesting that makers were earning a good profit from steady demand at this point. Finally, the tools of the trade, the moulds, were extremely expensive. The fact that they could command such a high price again indicates how essential they remained to the compo industry even after the introduction of machinery.

- By the early 1840s, reducing the level of refinements to frames helped to reduce price. Significantly, although machined wooden mouldings in the 1840 contributed to this price reduction, it was achieved without the assistance of the compo moulding machinery that finally responded to this demand.

- As prices from the Jackson ledger are wholesale and those from Eckford in 1841 retail, this price reduction over time was even greater. The need to reduce costs to the customer at this point almost certainly had less to do with competition from carton pierre and papier mâché (although, they were significant for the architectural use of compo), and more to do with the expanding market for frames in the nineteenth century, and the determination of producers to cater for that market. By the second half of the nineteenth century, the examples of both Goslett and Cassell show that objects on which compo was used were still expensive and generally remained outside the reaches of the lower middle classes.

[15] A theory suggested by John Anderson, Frame Conservation, Tate Britain. Of the few examples of original frame packages that have been identified to date from the last two decades of the eighteenth century, all had simple carved frames.

Chapter Six: Retail and Marketing

Introduction

The primary aim of this chapter is to identify the attitudes of the retailer and consumer to composition between the 1760s and *c.*1900, via retail and marketing material.

- This chapter discusses whether compo was ever presented as a truly innovative material.

- It examines what the advertising methods communicate about the status of those at whom it was aimed.

- It also considers what part the physical qualities of the material played in forming attitudes to compo.

These questions challenge the commonly held perception of compo as a largely imitative, cheaper alternative to wood carving and therefore second-rate. Indeed, the presence or absence of various types of evidence is significant in itself.

- Again, it is important to consider evidence for a wider architectural use that subsequently narrowed to a more limited application in frames, as previous evidence suggests.

- The main body of evidence takes the form of trade cards and catalogues, supplemented by excerpts from advertising based sources such as *The Art Union*. Efforts have been made to show critical awareness of bias or simple miscalculation of the market, hence sources such as the account books used in previous chapters, are essential in achieving a balanced picture.

- Although the time span under consideration is wide, analysis is concentrated on the earlier period up to around the middle of the nineteenth century. Again, this is because the bulk of information exists for this early period for good reason, clarified shortly. Other caches of chronological evidence help to delineate changes over time, in particular through the development of the firm Jackson's.

The Evidence

A consideration of prevailing attitudes to the subject of imitation in the late eighteenth century helps to place the following chapter in context. However in certain circles, and admittedly these are often academic ones, this is not always the view: "In the eighteenth century France and England, as is clear from their literature on aesthetics and technology, imitation was as accepted as it was accomplished [87, p. 1]." However, "Eighteenth-century theoreticians addressed imitation only as an intellectual problem, and only in the context of the fine and liberal arts [87, p. 1]." It is not until quite recently that the decorative arts were considered "worthy" of such consideration and within this, composition's place remains undefined. However, it is clear from some of the examples within this paper that craftsmen often used imitative materials to enhance, elaborate on, or improve upon nature. This is clearly noted in the landscape architecture of "Capability" Brown for example, but is quite evident in almost every area of the arts at this time. For example faux coral, which, through the use of artificial materials could be made into remarkable forms lacked by the genuine article but suggested by the latter. More importantly however, the impetus to do this did not come from the lack of coral at this time but was fuelled by taste. Imitation in the eighteenth century then was not content with "merely" deceiving the observer but an often exhaustive search for a trickery which could amaze and delight beyond the bounds of nature itself. Novelty was everything and if that novelty came cheaply then so much the better.

The following section examines the emergence of composition for interiors, primarily through trade cards, which are a major form of evidence for the way in which compo was retailed and consumed for the early years. Although very few trade catalogues or pattern books have survived, their use is indicated in some of these early cards.

The cards which are exclusively those of composition manufacturers or makers all post date 1780. The fact that these are some of the earliest cards describing compo when it was fairly new on the market is clear from the language used.
There is not so much a strong sense of the novelty value afforded by the new material, as assurances of its authenticity in descriptions such as "Real composition",[1]

[1] Jaques' card of 1790.

"Barker's Original manufacturers For Composition Ornaments"[2] (**Fig. 103**) and a shop bill from Lane, "Original Inventor of the Composition" dated 1792 (**Fig. 104**). Composition is depicted as a desirable, innovative material, but in a very similar way to patent medicine. Significantly, the physical qualities of the material are not directly alluded to, but its resultant advantages such as the cost of goods and the speed at which they could be supplied are usually very prominent: "those who promoted novelties often had to face the active hostility of vested interests, such as the manufacturer of substitutes or near substitutes…[88, pp. 124-169]".

The use of language suggests that compo, in common with patent medicine, was produced in a variety of formulae by different manufacturers, each trying to reassure consumers that theirs was in some way superior to the others. However patent medicine was usually heavily branded precisely because formulations were not necessarily so different from one another. As these cards do not advertise the benefits of the actual formulation, it is impossible to determine whether they refer to the four-ingredient material or something similar, from this evidence alone. However, in not mentioning the formulation, the notion of trade secrecy and therefore the idea that the formulation is desirable through its unique physical properties is promoted.

In line with previous evidence, other advantages of compo over carving, that would be quite apparent to the consumer included the range of stock mouldings of which a "Large Assortment is always ready for Inspection – Dimensions to Any Size or Pattern" (**Fig. 105**, 1784-1790). This is strongly connected to the growth of retailing at this time, particularly the success of shops, from which many of these producers were clearly selling their goods. Furthermore, the ornament they produced was being used to decorate them (**Fig. 106**). In addition to this ready-made service, descriptions also stress a far more individual service of the type customers would be used to when commissioning carved works. For example, the "sketch and pattern provided" for designs in Jaques' card, verso, 1799. Other clear advantages contained in descriptions include the use of compo for "Circular work" which required considerable skill, planning, and above all time when executed in carved wood (**Fig. 6**). Such work would be extremely costly. The advantages of compo for updating

[2] Date unknown but thought to be in the 1790s.

"New or Old WoodWork" is a recurrent point in these early and later cards, also recalling archival and object evidence of Chapter Three.

Constant affirmations of "short notice" and "Foreign & Country Orders particularly attended to & executed with Dispatch" communicate the speed at which ornaments could be supplied. This also indicates the scale on which compo was produced and consumed and the level of demand for such goods from foreign customers shopping in London at a time of considerable economic trouble. In addition, it highlights the role of London as the eighteenth century centre for the dissemination of new ideas and materials. As speed was one of compo's distinct and obvious advantages, it would be a key *difference* worth promoting in relation to carving in the minds of the consumer whether a direct comparison was made or not.

Direct comparison to carving point to a period of transition from carving to compo, perhaps indicating that this change first took place among producers of predominantly architectural ornament. For example, in the compo maker Jaques' earliest card, his business is described as: "Jaques & Son, Ornamental Wood Carvers".[3] Thomas Poyntell's direct comparison: "as neat as any carving" provides confirmation of a "transition", in addition to reassuring the consumer by stressing the *similarities* of compo to carving. Again, the fact that compo (like Sheffield plate compared to silver) could be rendered visually indistinguishable from carved ornament through painting or gilding, enabled such a comparison to be made. This points to the motivation for the development of compo as both imitative and innovative.

Crucially, this comparison serves to fix the idea of composition's viability as an alternative to wood carving in the mind of the consumer but at the same time, strongly suggests that compo *was* regarded as a direct imitation of carving and that consumers really valued wood as the genuine article. This type of marketing method endorses the theory that the consumer, sceptical and opposed to change, would only accept new materials and techniques if they were perceived to be as good as or indeed better than the original. This compromise or particular form of novelty is important because it

[3] Perceval Collection, Fitzwilliam Museum, Cambridge. Jaques seems only to have been known as Jaques & Son for a short time in the early 1790s, according to the trade directories, assisting the dating of these cards. See Appendix I.

indicates that consumers would only accept new ideas and goods if they were associated with comfortingly familiar elements. Therefore, if goods were presented as too radically different they faced rejection:

> The newness of the new product had to be reconciled with consumers' pre-existing experience, knowledge and expectations. Innovation had to be domesticated in almost every sense of that word, from the national to the personal. Consumers had to be offered an idea of the new artefact's potential (both practical and symbolic) which they could recognize. It is for this reason that so many of the new products...came to incorporate references to preciously familiar objects. Product innovation demanded of the supplier not just persuasion and education, but compromise and sometimes concealment [88, pp. 124-169].

In this way, Josiah Wedgwood (1730-1795) reproduced the Portland Vase (1790), his new techniques and materials showcased far more perfectly through the comparison than through a completely new design [89, p. 16]. His comparisons also served as publicity stunts as he really understood the mass market very well:

> I know they are much cheaper at the price than marble, and every way better, but people will not compare things which they conceive to be made out of moulds, or perhaps stamped at a blow like the Birmingham articles, with carving in natural stones where they are certain no moulding, casting, or stamping can be done [90].

Furthermore, "eighteenth-century manufacturers relied heavily upon the archaic model in their efforts to overcome resistance to innovation [89, p. 12]." They also relied specifically on the Antique. This method of enhancing product difference by drawing attention to similarities with the tradition model was well understood by manufacturers/retailers by this time. Through these means they were able to provide assurances without directly alluding to the material in its own right. The late eighteenth century consumer's attitude was therefore both sceptical and novelty driven.

The cards also reveal the broad range of uses to which compo was applied, substantiating the evidence of the Westwood catalogue. For example, Ross (**Fig. 107**, 1788) describes himself as "Joiner, Carver, Gilder & Picture Frame Maker At his

Composition Ornament Manufactory".[4] The range of architectural elements for every purpose, the looking-glass frame and chimneypiece feature widely, the latter still such an important part of late eighteenth century decoration. The scale of businesses is indicated by cards like that of the compo maker Thomas Poyntell (1783-85) who produced work for "Architects, Builders and Artificers" and "Funerals decently performed on the lowest terms" (**Fig. 108**). These effusive endorsements demonstrate how extensively composition was used for "every other kind of work in the building line" and not merely picture frames although the latter feature quite frequently, indicating a level of demand.[5] Indeed, frames feature equally in pre compo cards. Nevertheless, this architectural evidence substantiates information that the range of compo's use diminished over time.

Having established the emergence of the composition manufacturer around 1780 via trade cards, it is important to consider any differences in the approach taken by allied and competing fields. There is a clear distinction between the way in which compo and other building materials were advertised. For example "Thomas Brown Plaisterer", promoted "All Sorts of Plaister of Paris, truly prepared for all Artists without any Adulteration" (**Fig. 109**). This card is more conventional than those of compo makers because, although stressing the authenticity of its product, it is devoid of all the other language suggestive of novelty. This is because plaster of Paris was an old and familiar material and plastering a long established trade. No date is assigned to this card and Brown did not advertise in trade directories, although an absence from the directories does not mean that advertising was not needed.[6] It probably dates from the late eighteenth century and shows how older related and competing trades besides carving never went away.

Many of the cards of allied trades pre dating 1780 are those of carvers and gilders. However, after the emergence of compo in these cards, there is no noticeable decrease in the numbers advertising in trade directories and trade cards. Descriptions contained within many of these cards at this time show the range of other products and services offered (also noted in the cards of some of the compo makers). For example, the card

[4] The notes on the mounts of these cards indicate that the original owner of the collection, Ambrose Heal, assigned the dates using London trade directories.
[5] See Figure 6.

of Harraden (1792), carver, gilder, print seller and upholsterer advertised everything from "Fancy decorations" and "Drawings for copying lett [sic] on hire" to "Floors decorated in Chalk ornaments for Balls" in the "most elegant Stile [sic] & best manner" (**Fig. 110**).

The cards of carvers, like Robert Cribb (**Fig. 111**) advertise a basic range of traditional goods and services, while the earlier of the two cards of William Wade (*c.*1780, **Fig. 112**) also contains a basic list of services. However his later card has the additional statement: "Composition Ornaments for Chimney Pieces" (**Fig. 113**), similar to the card of Ross (**Fig. 107**). This approach indicates that those engaged in existing, traditional trades were keen to be part of new activity.

Descriptions in the majority of cards are not used to promote the style or design of the ornament, but the designs of the cards themselves were used in such a way. Indeed they went beyond this and delivered a message about the social status that the goods might bestow on those who purchased them. This is very much in line with trade cards at this time, which relied as much on the image as the text.[7]

There were distinct formats to the cards that changed with time and are closely linked to the point of sale. The style of the eighteenth century cards fall into several categories. A popular style in the mid eighteenth century and therefore old fashioned, that was used to advertise many goods and services and not merely compo, can be seen in the card of Sharp, a carver, gilder and picture frame maker (**Fig. 114**, *c.*1780s).[8] This card follows a classical theme with figures, a putto, architectural and sculptural elements; in this case a bust and capital, though a stone tablet on which the information is written is a common device, seen in the card of the compo maker Barker (**Fig. 103**, *c.*1780s). This type of card may have been old fashioned by the 1780s and therefore not commonly used for compo. However, its purpose was to sell the classical ideal through the use of "identifiable icons, whose presence transcends any particular material"[91, p. 197].

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[6] Notes on card mount affirm that the card could not be found in dictionaries.
[7] See Berg, Maxine and Clifford, Helen, 'Commerce and Commodity: Graphic Display and Selling New Consumer Goods in Eighteenth-Century England', in [91, p. 188].
[8] Sharp and Gillson, composition manufacturers, are noted in trade directories from at least 1790, when their address is 24 High Holborn. See also Appendix I.

Another simple form popular in earlier cards and trade sheets, at least from the 1760s, is the fine patterned boarder that appears to mimic needlework, (the framing of which is frequently advertised). A good example is the earlier card of William Wade (picture frame maker, carver, gilder and print seller) *c.*1780 (**Fig. 112**) and the card of the compo maker Thomas Poyntell (**Fig. 108**, 1783-5). Poyntell may have continued using a previous design from when he advertised as a carver. Certainly, this older design does not really communicate with the consumer. Wade however changes the design to reflect the style of ornaments that were being retailed as he makes the transition to compo (**Fig. 113**, *c.*1790s).[9] It is clear that this style continued to find favour into the 1790s, seen in the cards of Edward Wyatt **Fig. 115** (*c.*1790s-1800s)[10] and Robert Cribb (1790s to 1800s). The fact that these two tradesmen were carvers and gilders may indicate that older trades were sometimes slower to take the marketing initiative than their specialist compo making competitors. The cost of cards may also have been a factor. A number of the designs of compo makers, are similar to these later examples making good use of ornament and the chimneypiece (**Fig. 116,** *c.*1790 and **Fig. 117**, 1784).[11]

Among the cards of Jaques there is yet a third design (**Fig. 118** & **Fig. 105** above), dating from between 1784 and 1801 which features a royal crest (other examples include those of Leader from 1803 and 1814 (**Fig. 68**) and of Morant, *c.*1820s, **Fig. 119**). Claims of royal and aristocratic patronage were common in the eighteenth century. Their intention was to foster an image of high quality goods for an élite clientele of high social status but without using the goods themselves, and they are similar in this way to examples that make use of classical imagery. This is important because it has been argued that compo goods were what might be termed semi-luxury commodities because they were not custom-made on commission at the highest level [91, p. 187]. However, it is worth remembering that compo designs could be bespoke, just like carved objects. New, unique moulds could be commissioned for specific tasks and to the taste of particular individuals to create an exclusive and totally hand-

[9] Wade is noted in trade directories at 86 Leadenhall Street, removed from the earlier address at no.42.
[10] Edward Wyatt is noted in trade directories at least as early as 1796 at 360 Oxford Street and continues at the same address into the 1800s.
[11] The same chimneypieces continue to feature in Jaques' cards. That of 1799, shows an alternative design, although still of neoclassical inspiration.

crafted object. The fact that a maker may subsequently have re-used the mould to recover the cost does not detract from this fact. Nevertheless, the trade card, an expensive form of advertising, was one of the means by which semi-luxury goods of all kinds were advertised, and compo production was essentially batch production.

Trade cards of the 1820s and '30s provide evidence of further developments, for example the card of Edward Radcliffe, carver and gilder (**Fig. 120** *c.*1827). This card is in the form of a picture frame. The frame has a wide, straight-sided profile and the heavy, applied corners, imply the use of compo, also suggested in the text: "All kinds of Gilt Ornaments". Other examples (**Fig. 121** & **122**) show highly decorative sweep sided frames that were more fashionable but by no means new at this time. Such evidence supports that from the Jackson account book that the demand for frames was escalating.

The card of Jane Norcott (**Fig. 123**, *c.*1827) uses of the shop front (occasionally the interior is used) to remind the consumer of the particular goods purchased there and the retail experience in general. Although popular in the eighteenth century, this style continued to find favour into the 1840s (**Fig. 124**). In contrast, the card of Criswick & Ryan, "composition ornament and picture frame manufacturers" (**Fig. 71**, *c.*1830s) is aimed principally at the wholesale market with "The Trade" and "Builders supplied…". In line with that market, the design features a cartouche made up from a riot of different design elements, typical of the mid to late 1830s, and stressing the freedom which compo brought to design. The card of George Sully is slightly later and again aimed at the trade (**Fig. 38**, *c.*1840). Despite the range of trades supplied with ornament (which now includes the manufacture of letters), the design of this card again suggests that frame-makers were among the primary customers.

Millar's late nineteenth century text extolling the virtues of compo on shop fronts many years earlier, corroborates information from the earliest cards. This source reveals an important historical view of a material that was already "well seasoned" at the time of writing:

> It [compo] was largely used in Edinburgh, Glasgow, Dublin, and other towns for the decoration of wood mouldings on shop fronts, many of which are still in existence, and the composition seems harder

and in a better state of preservation than the wood work on which it was fixed. This gives ample evidence of its *durability*, [my italics] even when exposed to all weathers [25, p. 297].

Although no surviving examples have been located, an early catalogue (*c.* 1830s)[12] is entirely devoted to these façades although here they are advertised as made of papier mâché (**Fig. 125**). It is possible that these or similar designs were made up in compo (before producers once again turned their attention to promoting the ever present papier mâché), strengthening Millar's reference (**Fig. 126**). The fine detail achieved with compo was superfluous to requirements in this instance, and bulky designs would be extremely heavy. Again, the use of papier mâché here suggests that the durability of compo may have been a problem, despite the fact that Millar indicates the quality of examples that survived at least to the end of the nineteenth century. Durability is also noted quite frequently in relation to papier mâché as the following pages indicate. Evidence has demonstrated that the physical quality and durability of a material were usually critical to its acceptance. For example, the failure of the East India company towards the end of the seventeenth century to sell imported cotton shifts over those made of the traditional linen because they were not as durable and the quality of the sewing may also have been a factor [88, pp. 124-169].

Part II of Jackson's 1839 catalogue still survives and in this piece of trade literature they describe themselves as "Composition ornament and improved papier mâché and carton pierre manufacturers, modellers, carvers, and workers in ornamental Roman Cement and Plaster of Paris" [42].[13] Thus composition is still afforded a relatively prominent position. Their promotional assertions at the beginning of this catalogue provide insight into both the aims and practices of a major manufacturer of compo at this time and some clues as to the demands of their customers. The language shows that novelty now lies almost purely in "design and increased feeling and beauty of execution" and no longer in the material itself. Design and "higher matters of taste", which had been important to the late eighteenth century consumer, had become far more important than the type of casting material used. However, references to carton

[12] Although undated, this date was assigned because Jackson's were at 50 and 49 Rathbone at this time (noted in the catalogue). The styles also suggest the late 1830s, in addition to the fact that two other catalogues are known to have been produced in this decade.
[13] A note in the text refers to this second part of the collection as "Various Articles of Taste and Furniture".

pierre and improved papier mâché, which feature heavily in the catalogue for the first time, seek to reassure consumers that material deficiencies such as the stability of the material over time have been resolved. Clearly concerns about the durability of materials, which had always been an issue, had not disappeared.

The 1840 catalogue of the Queen's decorators H.W. & A. Arrowsmith is partly aimed at craftsmen themselves and indicates that a broader range of materials, old and new, were now available to the consumer for various elaborate architectural schemes (**Fig. 127**):

> The ornaments shown in our design are to be in relief; and may be made of composition, plaster of Paris, or any substance which can be run in moulds, or formed by a tool. Some persons prefer the introduction of carvings in wood; but the expense is greatly increased, and but little advantage is gained either in appearance or strength [92, p. 20].

Therefore, even the most eminent decorators of the day advocated the use of moulding materials, though it is clear that their customers sometimes preferred carved wood. Similarly, an extract from *The Art Union* expresses a contemporary (1842) view of papier mâché. All the uses towards which papier mâché is directed here include all those associated with compo, but its advantages over compo are much promoted. However, in expounding its virtues, the old comparison to wood carving is still there, implying that carving was still considered the benchmark of quality by which cast materials were measured:

> ...picture frames which, bid fair to rival the best carving in wood ever applied to the same purpose, ... The frames of Mr. Bielefeld present the best characteristics of fine carving, the course of the chisel, though subdued, is everywhere apparent, and the liberal resort to undercutting, and occasionally nearly alto relief, realize the peculiar finesse and spirit of the best manipulatists amongst the old carvers in wood; substituting, for the dull, prim, and mechanical mediocrity of works in putty composition, an easy, liberal and artistic dexterity in the execution, ... they are liable to no injury from chipping, as the common frames are; we have seen the effect of a picture entirely ruined in consequence of the frame being shattered during transit. An essential advantage also is, that these frames weigh no more than half the weight of the usual frames of the same sizes [24, p. 61].

Weight and durability could be a significant problem for compo no matter how satisfactory the recipe. Nevertheless, in an effort to convince readers that problems

with strength and "durability in any atmosphere" had now "ceased to be a matter of doubt", this extract also reveals that all had not been entirely satisfactory with papier mâché up to this point. Indeed, the journal devotes much energy to the aesthetic superiority of papier mâché, its "rare artistic qualities, which are lost at the height of a room or the summit of a column", precisely because it was observed to produce enrichments that lacked the crisp and satisfying detail of composition **Fig. 125**. Through direct comparisons, it is clear that despite composition's failings, it still retained a place in the market of 1842. Nevertheless, the production of frames in papier mâché may have presented some competition [24, p. 257].

Within the journal, the advertisement of C.J. Eckford (**Fig. 98,** 1841) indicates how picture frames were still using compo, when its broader architectural use had been under threat for a number of years. The primary emphasis here is on low cost but reinforced by the range and quality of available goods and services. Though materials are again not specified, a slightly later advertisement (1844) from the same journal, (**Fig. 128**) cites a "splendid and extensive stock of picture frames" that would have been largely if not completely made of composition, such as: "A richly-ornamented three-quarter frame, gilt and burnished, 28s; a very bold ditto, Bishop's half-length, £5." The reference to frames "in imitative oak, from 20s. upwards" shows there is no attempt to disguise the use of emulative materials, suggesting that they were now regarded as important in their own right [83, p. 274].

Following the Jackson shop front catalogue (late 1830s), an excerpt from *The Art Union* gives a view of composition in 1846, through the firm of George Jackson on whom the commentary is based. The purpose of the journal was to report on novelty and innovation as a marketing resource for firms:

> It is not many years since "composition" was almost the only material employed to imitate carving, and in its early application little other use was made of it than the decorating of doors, shutters, chimney-pieces, &c. The style of architecture in vogue, at the time this invention was first introduced, was peculiarly suited to the mode of production best calculated for this material; and many houses in the metropolis, particularly those erected by the Messrs. Adam, the architects of the Adelphi, are profusely decorated with composition ornaments. Improved taste soon required that the material, or some other, should be rendered capable of more extensive development, and that works in high relief should be produced; to this may be traced the origin of many of those attempts that are constantly made to bring

in to use other materials, and several compositions have been devised possessing different degrees of value according to the purposes to which they are to be applied [93, p. 53].

Although this extract gives a nineteenth century view of the eighteenth century use of the material, the relative merits of the various materials within the class at this period were well understood. This view also indicates that it was the taste (in the 1830s and '40s) for ornament in high relief with undercuts that provided the impetus for the *constant* attempts at developing different materials.

By 1846, producers were finding new ways to use old and "new" casting materials. Such methods of production were considered innovative and composition was recognised as adding value, not taking it away "as much greater elegance may be gained than by adhering too rigidly to the monotonous repetition of castings, to which they [architects] now resort [93, p. 53]. Several object examples illustrated within the 1846 issue of the journal demonstrate this, one of which is a pier table using of both composition and carton-pierre (**Fig. 129**), and a small table using carton-pierre and papier mâché. However, those objects "where part of the design required a greater delicacy of finish than could be given by either of these, have been mounted with composition" [93, p. 53]. The staircase (**Fig. 130**) is also an example of the combined use of materials to produce an object whose design is influenced by the use of these materials. Here the basic strapwork was made of hardwood and the foliate enrichments "coated on" in composition: "By this means a very elegant effect is produced, and a large amount of expense saved [93, p. 53]". Again, it is the way in which the material is used here and not the material itself that is said to be new or different.

The 1874 catalogue of the furniture company, James Shoolbred of Tottenham Court Road, illustrates the change in the way objects were now displayed and consumed [94]. This catalogue shows illustrated examples of entire room schemes in particular styles in addition to specific pieces (**Fig. 131** & **132**), and many pieces undoubtedly relied on composition for their decoration. However, as compo was no longer considered a novelty, its advertising became very much subordinate to the latest innovations, if mentioned at all. This catalogue is aimed at what was now a far wider, middle class retail market that demanded decorating ideas. Naturally, large

manufacturers like Jackson's would have been used by the trade for *their* own customers, as is frequently the case today. Naturally, the manufacturers were often then, as today, fulfilling a dual role and catering to the retail sector through a shop, with the factory or workshops behind. This would provide a visible presence, which is always a primary form of advertising.

By the 1870s compo had long since ceased to be retailed as an important material in its own right. It is not mentioned in Jackson's 1882 catalogue of "Cornices" at their "Carton Pierre, Papier Mâché and Patent Fibrous Plaster Works [95]. Their 1885 catalogue of "Architectural Ornaments & c" is concerned with patent fibrous plaster and carton pierre only, and their 1889 catalogue of the same name mentions a wide range of materials, but again, compo is excluded: "Papier mâché, carton pierre, plaster and cement manufacturers patentees of the canvas plaster; wood carvers & c [96]." It is felt to be significant that this 1889 catalogue is the first in which Jackson's state that they were established in 1780. Competition from specialist machine manufacturers and the constant development of materials may have driven Jackson's to foster an association with Adam, purely as a marketing tool, particularly at a time when neoclassicism was enjoying renewed popularity.

Although Morell's catalogue is dated 1910, it is worth mentioning, because of previous evidence that their patterns were available in the last decade of the nineteenth century. Promotional assertions at the beginning of the catalogue, show that this large and prominent London picture frame and moulding manufacturer whose "extensive stock, which is acknowledged to be the largest in the world", was enjoying a genuine period of prosperity (**Fig. 133**).

> I have again much pleasure to inform you that since my last issue, the whole of the departments have been considerably enlarged, to meet the demand of increased trade, and having a large staff of experienced workmen... [46]

However, as noted in Chapter Two, when the Morell catalogue is subject to closer scrutiny, it is apparent that the range of patterns is not quite as extensive as the marketing literature suggests. Issues such as quality at low cost are always brought to the fore:

...Wherever it has been possible to reduce the price of any of the goods, the reduction has been made; and I feel satisfied that, quality and finish considered, no similar goods can be bought at any other house in the Kingdom at lower prices.

Morell's interest in covering as wide a customer base as possible is clear from the varying qualities offered within their range, such as "second and third quality gilt mouldings and slips". Descriptions of the various coatings [finishes] such as "best quality imitation ivory mouldings" (**Fig. 134**) again suggest that there is no pretence as regards imitation [46, p. 112]. The decorative *effect* was all-important and the allusion to costly materials and styles was sufficient to attract consumers. Other coatings such as "best quality washable old gold, matt gilt, and inside mouldings" reveal the consumer quest for improved hygiene to reduce diseases, many of which reached epidemic proportions around this time [46, pp. 5-12].[14]

Summary

- Compo was retailed as a novelty but was compared to familiar, traditional woodcarving to render it acceptable to the innately sceptical eighteenth century consumer. Towards the mid nineteenth century, evidence indicates that the novelty value had shifted from the material to the design and material emphasis now lay with other materials. As regards materials like carton pierre but particularly papier mâché, the word "improved" implies a significantly development, but papier mâché had been the subject to continual experimentation in the broader quest to develop moulding materials. Whether experimentation at this stage really did constitute a significant improvement is in doubt. It seems more likely that "improved" was used more as a marketing ploy in a buoyant market that was in constant need of "new" and different ideas and a wider range of products to choose from.

- Early comparisons to carving indicate that compo was a very recent introduction in the 1780s.

[14] Exactly what coating rendered the surfaces washable is a subject of further investigation, however the front cover shows that it was a patent and therefore is explained within the specification.

- As compo was retailed in a similar way to patent medicine, the formula was deliberately kept secret to create the idea that it was desirable through its unique physical properties. This implies that there was actually not a great deal of difference between one formula and the next in terms of its handling qualities. Although the formula is concealed, it is clear that the material to which the cards refer had the same physical characteristics as the compo with which this thesis is concerned. For example its use for "Circular work".

- Early cards further confirm diversity within the structure of the trade, supporting the evidence of the ledgers among carving, gilding and frame-making trades, and indeed for "Architects, Builders and Artificers".[15] Again, the material would need to have the physical properties of compo to sustain these operations. There is evidence that producers supplied both the wholesale and retail market, some firms, catering more to one than the other.

- The first cards confirm the broad range of applications, which subsequently narrowed to picture frames in the early nineteenth century. Larger producers such as Jackson's revert to a predominantly architectural output by the 1830s and it is the carvers, gilders and frame-makers who continue frame production in compo for the most part, though there are notable exceptions.

- The first cards confirm the broad range of applications, which subsequently narrowed to picture frames in the early nineteenth century. Larger producers such as Jackson's revert to a mainly architectural output and it is the carvers, gilders and frame-makers who continue frame production in compo for the most part, though there are notable exceptions.

- At the outset, consumers were clearly from the higher end of the social hierarchy. Trade cards were an expensive form of advertising, and although the beauty of compo was that repeat ornament could be produced at speed, objects were still individually produced from unique reverse carved moulds. Ornament was not

[15] The trade card of Thomas Poyntell.

merely cast from moulds made from taking a plaster cast from a piece of relief carving for example. Furthermore, work could be custom made at the highest end of the market. The use of card designs to equate goods with the idea of exclusivity and discriminating taste, in line with the advertising of other goods at this time, was a means of overcoming scepticism surrounding moulding materials, and of offering reassurance. It was not necessarily an indication that the goods were made in an inferior way to carved goods at this point, as is frequently the interpretation. However, as more goods could be created more quickly, the customer base is seen to expand, finally reaching the consumer to whom a washable frame was important.

- Durability was clearly a key issue for all products. The fact that compo objects generally appeared in perfect condition when newly made points toward damage and deterioration as a major factor in forming compo's reputation as a poor quality mass-produced material.

Conclusion

The principal aim of this thesis is to influence those individuals who are interested in and directly involved with the present and future preservation of composition objects through a greater appreciation of their historical and technical significance within a much neglected area of design history. The entire frame "packages" should be given full and careful consideration in their own right and measures taken to recreate how pictures were originally viewed where this may be possible.

This objective is achieved through a re-evaluation of past and present perceptions of compo as a poor quality, low cost, mass produced substitute for carved wood and therefore made for consumption at the lower end of the market. This key point is addressed from different perspectives through the themes of each chapter.

- The use of compo for "circular work" indicates that its physical advantages over wood carving were understood in the eighteenth century by both producer and consumer alike, and that it was developed to supply the taste for neoclassical ornament, but in a more expedient way in a period of economic crisis. Patent evidence indicates a significant level of activity in the search for new casting materials of all kinds in the second half of the eighteenth century. Although the Westwood patent recipe contains additional ingredients to the four-ingredient formula, it is close enough to indicate that at least one recipe with very similar qualities was known in the 1780s. The fact that it was patented also suggests that similar formulae used in similar ways were not very common at this time. Although subsequent recipes differ from one another to the extent that an entire ingredient is absent (even by the middle of the nineteenth century), it is still possible to make a serviceable casting material. Clearly many formulae continued to be used throughout the nineteenth century by different tradesmen, which differed to either a small or large degree. The four-ingredient formula was the most commonly used but there is no evidence for a development that could constitute a real improvement on the Westwood recipe.

- An association with machine-production has been one of the factors prompting the low opinion of compo. However, the technical literature and the objects themselves revealed the relatively late introduction of specialist frame-making machinery (in the late 1860s). When the use of machines does become more widespread in the 1870s and 1880s, although there is visual evidence that four ingredient composition was used, visual and documentary evidence also suggest that materials other than compo were often employed. Crucially, traditional manual techniques continued to be used for compo work throughout the nineteenth century, sometimes in conjunction with machine produced lengths and assisted by the ongoing production of highly crafted intaglio carved moulds. Developments in machinery towards simpler models are linked to a greater standardisation of the end product. While the quality of these examples may deserve criticism, a loss of this record would again, deprive us of a balanced view of this period of design history.

- An examination of evidence concerning the presupposed dates for the inception of compo, together with evidence put forward in the rest of this thesis, strongly challenges anecdotal evidence for the involvement of Adam. However, this does not mean that compo was first used as a cheap, mass-market substitute for carving.[1] Jackson's involvement at the outset of compo production in this country remains unsubstantiated. Competition from machine manufacturers and competing materials, may have driven them to foster an association with Adam as a marketing tool nearly a century later.

- Many surviving objects, a large number of them picture frames, constitute examples of the use of these traditional tools and techniques. Jackson's customer account book reveals that considerable time and care was expended on their individual production at the beginning of the nineteenth century. Although production quality eventually begins to deteriorate, first noticed in the early 1840s, it is clear that this was not as a

[1] It is to be remembered that original print frame "packages" which can be dated to the 1780s and `90s are carved.

result of machinery but due to the reduction in the stages of manufacture and thus the time invested.

- Examination of the division of labour has proved the complexity of early nineteenth century production, the layers of subcontracting and thus the range of tradesmen involved reflected in individual objects. Many of these tradesmen were most prominent carvers, such as George Leader, who were almost certainly employed in the production of carved frames before the widespread introduction of compo. Therefore, compo designs, for the most part, were a direct product of the intaglio carving skills within these workshops, and good casts directly reflect these skills. Thus it could be said that compo frames have no less rich a provenance than their carved counterparts, although they are considerably more complex.

- Although compo examples were much cheaper than their carved equivalents to produce in the early nineteenth century, they were still very expensive and well beyond the means of all but the wealthier classes. This further challenges the dichotomy between high priced, high quality and strongly individualised objects and low priced, low quality, completely standardised pieces [97]. Indeed evidence indicates that prices remained high throughout the nineteenth century, even for goods that were of a vastly inferior quality.

- Compo was initially marketed as both an imitative and innovative material, lending further weight to evidence for very early batch production during the 1780s. However, the fact that compo was used to modernise outmoded designs both during neoclassicism and the Regency runs counter to the argument that compo was used in a purely imitative way. The visual imagery of retailing literature suggests that although the market was wider than that for carved goods, producers were still targeting the higher end of the market. Marketing methods seem to have influenced those of allied trades such as carvers, gilders and picture frame makers. By the middle of the nineteenth century, evidence indicates that compo added value and was

marketed as a desirable material in its own right, although it was the design and not the material that was important to consumers at this point.

- The importance to the consumer of durability in a material or an object is emphasised by retail literature. The fact that so many compo objects to have survived are in very poor condition can only colour people's view, but it is important to remember how these objects would have appeared when first made.

- Finally evidence indicates an initial, broader architectural application which narrowed to use principally on picture (and mirror) frames, primarily after the appearance of materials such as carton pierre and improved papier mâché in the 1830s.

On balance, evidence has demonstrated that, although a batch production material, compo could also represent unique objects of superior quality at high prices and for elite markets. During its history it was not exclusively or even primarily used to create multiples of inferior quality, sold at low prices and intended for a mass-market [98]. Conservators, curators and collectors should reassess the composition objects in their care taking this into account and adjust their practices accordingly. Exactly how these practices should be adjusted in terms of acquisition and disposal policies, preventive and interventive conservation measures, would be the subject for a second thesis.

It is important to stress that the history of composition is not a simple linear history and although evidence has highlighted some of the more pronounced developments, every object must be assessed on its own merit. This thesis aims to significantly broaden the knowledge on which some of those decisions are based, however it has also highlighted many other important areas for further research. For this reason a list of criteria for assessing an object has been avoided. It is strongly felt that such a list would present a very superficial synopsis of this thesis and compromise the integrity of what it trying to achieve.

Conclusion

Different stands of evidence have been important within the broad scope of this thesis and the wider focus has been essential to establishing a clearer perspective. However, this research also identifies the need for further case study led research into specific collections, particularly into collections of wooden moulds for which much progress as already been made. Other areas of investigation include trades such as button manufacture, which is linked to wood turning and indeed many other trades. Research into foreign tradesmen in London would also prepare for an intensive study into the continental history, through European archives, again the subject of another thesis.

Date	Name	Profession	Address
1781	Adam, William and Co.	Merchants	Robert St., Adelphi
1784	Lane, Mary	Composition Warehouse	104, Oxford-Street
"	Leader, Geo.	Carver & Gilder	218, Oxford-Street
"	Poyntell, Thomas	Ornament Manufacturer	73, Holborn
"	Smart, John	Composition Ornament Manufacturer	96, Burnhill-row
"	Johnson, John, jun.	Builder	32, Berners-Street
"	Adam, Robert	Architect	Robert Street, Adelphi
1790	Jaques & Son	Composition Ornament Manuf.	14, Holborn
"	Lane, Robert	Composition Manufactory	104, Oxford-Street
"	Sharp & Gillson (different spelling)	Chimney-piece and Composition Ornament Manufactory	24, High Holborn
"	Sharpe and Gilson	Composition-warehouse	70, Holborn
"	Ross, David	Carver & Gilder & c.	Gt. Portland-St. Cavend. sq.
"	Poyntell, Thomas	Chimney-piece-maker	71, High Holborn
"	"	Composition Warehouse	73, High Holborn
"	Smart, John	Chimney-piece Manufactory	129, Bishopsgate without
"	Thorp, James	Ornament. Composition maker	24, Princes St., Soho
1793	Jaques & Son	Composition Ornament Manuf.	14, Holborn
"	Lane, Robert	Composition Manufactory	104, Oxford Street
"	Sharp & Gillson	Chimney-piece and Composition Ornament manufactory	24, High Holborn
"	Sharpe & Gilson	Composition warehouse	70, Holborn
"	Ross, David	Carver & Gilder & C.	Gt. Portland St., Cavendish Sq.
"	Poyntell, Thomas	Chimney-piece maker	71, H. Holborn
"	"	Composition warehouse	73, Holborn
"	Cribb, Robert	Carver & Gilder & Printseller	288, High Holborn
"	Smart, John	Chimney-piece manufactory	129, Bishopsgate without
"	Thorp, James	Ornament. Composition maker	24, Princes St., Soho
1799	Jaques, John	Composition ornament manufactory	14, High Holborn
"	Leader, George	Carver to his Majesty	188, Oxford-Street
"	Ross, David	Carver & Gilder	98, Gt. Portland-St.
"	Cribb, Robert	Carver & Gilder	288, High Holborn
"	Jackson, Thomas	Composition manufactory	Holborn
"	Smart, John	Composition manufactory	133, Bishopsgate-Street without

"	Dupree, Thomas	Carver & Gilder	29, Church-Street, Spitalfields
1802	Jaques, John	Chimney-piece and composition ornament manufacturer	14, High Holborn
"	Leader, George	Carver	188, Oxford St.
"	Brown, Richard	Plaisterer (not sure if compo maker)	11, King St., Bloomsbury
"	Ross, David	Picture-frame maker & gilder	98, Gt. Portland St., 1s(?)
"	Poyntell, Thos.	Chimney piece manufactory & composition ornament maker	24, High Holborn
"	Cribb, Robert	Carver & gilder	288, High Holborn
"	Jackson, Thomas	Composition ornament manufacturer	Tottenham Court Rd.
"	Thorp, James	Plasterer and ornamental composition manufacturer	39, Princes St., Soho
1805,6 & 7	Jaques, John	Chimney piece manufactory	14, High Holborn
"	Brown, Richard	Plasterer	11, Upper King St. Bloomsbury
"	Ross, David	Picture frame maker & gilder	98, Gt. Portand St.
"	Cribb, Robert & Son	Carvers & gilders	288, High Holborn
"	Jackson, Thomas	Composition ornament manufacturer	Tottenham Court-rd.
"	Thorp, James	Ornamental composition manufactory	39, Princes-st., Soho
1806	Jackson, Thos.	Composition ornament manufacturer	Tottenham ct. rd.
"	Jacques, John	Composition manufacturer	14, High Holborn
"	Smart, J.	Composition manufactory	133 Bishopsgate-without
"	Thorp, James	Composition ornament maker	39 Prince's st., Leices-sq.
1809-11	Jaques, John	Manufacturer of marble & other chimney-pieces, composition-ornaments, bronzed figures, & C.	13 & 14, High Holborn
"	Ross, David	Carver & gilder	98, Gt. Portland St.
"	Cribb, Robert & Son	Carvers & gilders	288, High Holborn
"	Jackson, Thomas	Composition ornament-manufacturer	Tottenham Court-Rd.
"	Thorp, J.	Composition ornament-maker	39, Princes st., Leicester-sq.
1814	Blundell & Pritty	Composition ornament manufacturer	6 Little St. Andrew's St. (1st time entry appears) *
"	Bower, G. & Son	Gilt ornament maker	17 Thavies inn, Holborn Hill
"	Jacques, John	Composition manufacturer	14, High Holborn
1817	Blundell & Co.	Ornament manufacturers	6 Saint Andrew Street (little), Seven Dials
"	Jackson, G.	Composition ornament manufacturer Composition figure maker	50 Rathbone Place, Oxford St.
"	Jackson, Thos.	"	246 Tottenham ct. rd., St. Giles
"	Jacques, John	Composition manufacturer	13, High Holborn - Holborn bars

"	Sully, J.	"	17 Saffron Hill (Great), Hatton Garden
1820	Jaques, John	Composition, & c. manufr.	4, Long Lane, Smithfield
"	Ross, J.	Carver & gilder	98, Gt. Portland St., Ox. St.
"	Jackson, G.	Comp. Orn. Mkr.	50, Rathbone pl., Ox. St.
"	Jackson T.	Ornament manuf.	246, Tottenham ct-rd.
"	Thorp, James	Comp. Orn. Mkr.	39, Princes st., Leic.sq.
"	Sully, J.	Comp. Orn. Mkr.	17, Cl-. Saffron hill
"	Merritt, Danl.	Comp. Manuf.	15 Lt. Portland St, Marylebon.
"	Wiltshire, S. C.	Carver & gilder	1 Ball alley, Lombard St.
1823-4	Blundell, Wm.	Composition Ornament Makers	6, Little Andrew St., London
"	Cash, John	"	20 Roll's-Bdgs, Fetter-la
"	Dupree	"	10 Brooks's -mkt, Holb.
"	Freeman, W. H.	"	42 Princes-st., Soho
"	Groves, Jn.	"	8 Bishopgate-without
"	Jackson, Geo.	"	50 Rathbone-place
"	Jackson, Thos.	"	246 Tottenham-ct-rd
"	Jaques, Wm.	"	55 Bartholomew-close
"	Merritt, Daniel,	" (and modeller)	15 Little Portland-st
"	Smart, Wm.	"	Newman's-ct. Bishopsgate-without
"	Sully, Geo.	"	6 Clerkenwell-close
"	Sully, John	"	17 Great Saffron Hill
"	Thorp, James	"	42 Princes-st, Soho-sq
"	Wiltshire	"	30 Grafton-st, Soho
1823-4	Adam, William	Carvers & Gilders (much longer list than 1828)	17 St. Surrey-St.
"	Blundell, Wm.	"	6 Little St. Andrew's
"	Crouzet, John	"	11 Gt. Titchfield-St.
"	Dolman, Edward	"	1 Brompton-Rd
"	Fisher, Ed.	"	36 Leadenhall St.
"	Garbanati, Joseph	"	404 Strand
"	Green, Josh.	"	15 Charles-St., Midx.-Hos.
"	Leader	"	188 Oxford-St.
"	Legg, Thos.	"	37 Windmill-St., Tot-ct-rd
"	Tijou, Michl.	"	17 Greek-St. Soho
"	Tijou, Thos.	"	73 Union-St., Boro.
"	Vokins, John	"	5 Upper Rathbone-Pl.
"	Wyatt, Edward	"	360 Oxford-St.

1828	Blundell and Sanderson	Composition Ornament Manufacturers	6 Little St. Andrew's st., Seven-dials
"	Brown, Jos.	"	22 Glo'ster-St., Bloombs.
"	Cash, John	"	20 Roll's bdgs, Fetter lane
"	Freeman, W.H.	"	42 Princes street, Soho
"	Dupree	"	Brook market, Holborn
"	Jackson, Geo.	"	50 Rathbone place
"	Jackson, Thos.	"	246 Tottenham ct. rd.
"	Jaques, John	"	4 Long lane, W. Smithfield
"	Marriott, Edward	"	Tottenham ct. rd.
"	Smart, John	"	133 Bishopsgate-within
"	Sully, John	"	17 Great Saffron hill
"	Sully, W.	"	Peter st., Saffron hill
"	Wiltshire, Leonard	"	26 Grafton st., Soho
1828	Adam, William	Carvers & Gilders	17 St. Surrey-St.
"	Blundell, Wm.	"	6 Little St. Andrew's
"	Crouzet, John	"	11 Gt. Titchfield-St.
"	Dolman, Fred.	"	8 Cornbury-Pl, Okt-Rd.
"	Dolman, Edward	"	1 Brompton-Rd
"	Fisher, Ed.	"	12 Beer-La, Tower-St.
"	Garbanati, Joseph	"	404 Strand
"	Green, Josh.	"	15 Charles-St., Midx.-Hos.
"	Leader	"	188 Oxford-St.
"	Legg, Thos.	"	37 Windmill-St., Tot-ct-rd
"	Tijou, Michl.	"	17 Greek-St. Soho
"	Tijou, Thos.	"	73 Union-St., Boro.
"	Vokins, John	"	5 Upper Rathbone-Pl.
"	Wyatt, Edward	"	360 Oxford-St.
1828	Nash, Jn. [to the King]	Architects & Surveyors	Dover St. Pic.
"	Wyatt, Son, and Utton	"	5 New Inn
"	Wyatt Jeff.	"	50 Lower Brook-St., Grosvenor Sq.
"	Wyatt, L.	"	Albany, Picc.
	Wyatt, B. W.	"	2 Foley-Place
1840	Braithwaite, M. B.	Composition Ornament Makers	2 Paradise St. Finsb.
"	Brown, Joseph	"	25 Newman st. Oxford st.
"	Buxton & Rogers	"	13 Wells st.Oxford st.
"	Jackson, G. & Sons	"	49 & 50 Rathbone place

1840	Braithwaite, M. B.	Composition Ornament Makers	2 Paradise St. Finsb.
"	Brown, Joseph	"	25 Newman st. Oxford st.
"	Buxton & Rogers	"	13 Wells st.Oxford st.
"	Jackson, G. & Sons	"	49 & 50 Rathbone place
"	Parsons, J. H.	"	Brownlow st. Bedfd. rw
"	Smart, William	"	18 Crown st. Finsbury
"	Sully, George	"	16 Clerkenwell green
"	Sully, John	"	17 Ct. Saffron hill, Hat. gar
1849	Brown, Jsph. & Geo.	Composition Ornament Makers	25 Newman St. Oxfd. St.
"	Butcher, George	"	23 Wardpir St. Soho
"	Buxton & Rogers	"	13 Wells st.Oxford st.
"	Criswick & Lepard	"	6 New Compton St.
"	Dayson, Thos.	"	18 Poenix St., Soho
"	Freeman, J.	"	39 & 40 Bowling gn. La Clel.
"	Gadwell, Thos. H.	"	21 & 87 Gracechurch St.
"	Goslett, Alfred	Picture & Looking glass frame makers	26 Soho Sq. W.
"	Griffin, Wm.,	"	39 Charlotte St. Whitechpl.
"	Horn & Co.	"	38 Bedford st. Covent garden
"	Hughes, Wm. & Co.	"	2 Brewr. St. nth. Gswl. Rd.
"	Jackson Geo. & Son	"	49 & 50 Rathbone place
"	Ryan, James	"	13 & 14 Long acre
"	Smart, Wm., jun.	"	18 Crown St., Finsbury
"	Sully, George	"	16 Clerkenwell green
"	Wainwright, John	"	8 Rose Street, Soho
"	Bourlet, Thos.	"	15A, Little Portland St.
"	Garbanati, Joseph	"	37 Southampton St, Std.
"	Garbanati, Henry	"	16 St. Martin's court.
"	Garbanati, Paul	(Also Looking-Glass Maker)	92 Newman St.
1850	Brown, Jsph. & Geo.	Composition Ornament Makers	25 Newman st. Oxfd.st.
"	Buxton & Rogers	"	13 Wells st.Oxford st
"	Criswick & Lepard	" (Also listed as Picture & Looking Glass Frame Makers)	6 New Compton st
"	Dayson Thos.	"	18 Phoenix street, Soho
"	Dearen, Francis Thos.	"	54 Greek st. Soho
"	Freeman J.	"	39 & 40 Bowling gn.la.Clknwl

"	Griffin, Wm.	"	37 Charlotte st. Whitechpl
"	Horn & Co.	"	38 Bedford st. Covent gardn
"	Jackson, Geo. & Sons	"	49-50 Rathbone pl
"	Piper, William	"	3 Dean street, Soho
"	Ryan, James	"	13 & 14 Long acre
"	Smart, Wm. Jun.	"	18 Crown st. Finsbury
"	Sully George	"	16 Clerkenwell green
"	Wainwright, John	"	8 Rose street, Soho
1852	Brown, Jsph. & Geo.	Composition Ornament Makers	25 Newman St. Oxfd. St.
"	Buxton & Rogers	"	72 & 73 Wells st.Oxford st.
"	Criswick & Lepard	"	6 New Compton St.
"	Freeman, J.	"	39 & 40 Bowling gn. La Clel.
"	Griffin, Wm.,	"	36 & 37 Charlotte St. Whitechpl.
"	Horn & Co.	"	193 High Holborn
"	Jackson Geo. & Son	"	49 & 50 Rathbone place
"	Ryan, James	"	13 & 14 Long acre
"	Smart, Wm. Jun.	"	18 Crown st. Finsbury
"	Sully George	"	16 Clerkenwell green
"	Wainwright, John	"	8 Rose street, Soho
"	Dearen, Thos., Francis	Carvers & Gilders	54 Greek St. Soho
"	Papera, Thos.	"	13 Stephen St. Tottenhm. ct. rd.
"	Piper, William	"	3 Dean Street, Soho
"	Shirafs & Cook	"	38 Bedford st., Covt. Grdn.
"	White & Parlby	"	4 Rathbone pl. Oxford St.
1855	Brown, Geo.	Composition Ornament Makers	25 Newman St., Ox. St.
"	Bucalossi Bros. (P & B)	"	148 High Holborn
"	Buxton, Charles	"	72 & 73 Wells St. Oxfd. St.
"	Chillingworth, J.C.	"	32 Frances St. Westm. Rd.
"	Cole, James	"	3 George Yd., Princes St. Soho
"	Criswick, James	"	6 New Compt. St.
"	Dayson, Thomas	"	18 Phoenix St. Soho & 4 Lisle Street, Leicester sqr.
"	Freeman, J.	"	39 & 40 Bowling grn. la. Cknwl.
"	Griffin Wm.	"	36 & 37 Charlotte St. Whtchp.
"	Henson, Robert,	(marble)	113A Strand
"	Horn & Nuttall	"	193 High Holborn

"	Jackson Geo. & Sons	"	49 & 50 Rathbone pl.
"	Lee, George	"	4 New inn yard, Shoreditch
"	Scotcher, Thomas Jas.	"	2 Duck Lane, Soho.
"	Shirafs & Cook	"	38 Bedford St. Covt. grdn.
"	Sully, George	"	16 Clerkenwell green
"	Sundall, Krichir	(Leather)	27 Poland St.
"	White & Parlby	"	4 Rathbone pl. Oxford St.
"	Bielefeld, Chas. F. (papier mache)	Picture & Looking glass frame makers	15 Wellington St WC
"	Criswick, James	"	6 New Compton St. WC
"	Eckford Hen.	"	G. Peter's pl. Hemming's row
"	Garbanati, Paul	"	385 Ox. St.
"	Goslett, Alfred	"	26 Soho Sq. W, & George Yard, Crown St, Soho WC
"	Lee, Samuel	"	125 Gt. Portland St. Oxfd. St.
"	Yates, George	"	10 Warwick St., Regent St.
1861	Brooks, Wm.	Composition Ornament Makers (Gilt moulding manufacturers not listed for this year)	14 Gt. Queen St. Lion's inn WC
"	Brown, Geo. & Alfd.	"	25 Newmn. St. Oxfd. St. W
"	Buxton, Mrs. M.	"	72 & 73 Wells St. Oxfd. St. W
"	Cole, James	"	9 Rupert St. Haymarket, W
"	Criswick, Hy. & J.	"	6 New Compton St. WC
"	Dayson, Thomas	"	18 Phoenix St. Soho, WC & 4 Lisle Street, Leicester Square W
"	Findley, Henry	"	92 Newman Street W
"	Freeman, John	"	11 Little Compton St. W, & 17 Great Bath St., Coppice Row EC
"	Green, Alfred	"	19 Craven ter. Hyde Pk. W
"	Henson, R. (marble)	"	113A Strand WC
"	Jackson, George & Sons	"	49 Rathbone Pl. W
"	Nuttall, William	"	193 High Holborn, WC
"	Odell, Henry George	"	Wilmington Yard, 28 Guildford Pl. Bagnigge vells Rd., WC
"	Pashley, John	"	19 Red Lion Sq. WC
"	Smart, Wm.	"	41 Clifton St., Finsbury EC
"	Sully, George	"	16 Clerkenwell Green EC

"	White & Parlby	"	49 & 50 Gt. Marylb. St. W
1861	Binning, Frank	Picture & Looking glass frame makers	83 Theobalds Road WC
"	Bielefeld, Chas. F.	(papier mache)	21 Wellington St WC
"	Criswick, Hy. & J.	"	6 New Compton St. WC
"	Engert, Adam Cyrus & Co.	"	75 City Rd., EC
"	Garbanati, Paul	"	14 Marylebone St. W
"	Goslett, Alfred	"	26 Soho Sq. W, & George Yard, Crown St, Soho WC
"	Ryan, James	"	116 Londg Acre WC
"	Watts, Jas. W.	(gutta percha)	20 Ironmonger Lane EC
"	Scully, Richd.	"	73 Banner St., St. Luke's EC
"	Whetstone, Thomas	(by steam machinery)	29 Charles St., Hatton Grdn. EC, & 3 & 4 Bleeding Hart Yd., Hattn. Grdn EC
1866	Bielefeld & Co. (p. mache)	Composition Ornament Makers	21 Wellington St.
"	Brooks, Wm. & Son	"	14 Gt. Queen St. WC
"	Brown, Geo. & Alf.	"	24 & 25 Newman St.
"	Buxton, Mrs. M.	"	72 & 73 Wells St.
"	Chillingworth, John C.	"	29 London Rd. Sthwk. S
"	Cole, James	"	9 Rupert st. Haymarket, W
"	Criswick & Dolman	"	6 New Compton
"	Currie, Joseph	"	177 H. Holborn
"	Findlay, Henry	"	92 Newman St. W
"	Freeman, Jn.	"	17 Gt. Bath St. Coppice Row EC
"	Jackson	"	49 Rathbone Place
"	Mills, Albert	"	22 & 23 Crown St. Soho
"	Mound, Lucien	"	1 Hanway St. Oxford St. W & 11 Sutton St. Soho Sq. W
"	Nuttal, William	"	193 H. Holborn
	Odell, Wm.	"	51A Rosaman St, Clerkenwell, EC
"	Parby, Josiah	"	34 & 35 rathbone Place, W
"	Smart, Wm.	"	41 Clifton St. Fins.
"	Sully, George	"	16
"	Taylor, Jonathan	"	84A Margaret St. W
"	White, William	"	49 & 50 Gt. Marylb. St. W
1866	Mound, Lucien	Carver & Gilder (Incomplete listing)	1 Hanway St. Oxford St. W & 11 Sutton St. Soho Sq. W
"	Mound, Augustus Robert	"	60 Wardour St. Soho, W & 8 Huntley St. Bedford Sq. W
"	Gessell & Lea	"	28 & 29 Gt. Sutton St. EC

"	Eckford, John	"	8 Rose St. Soho, W
1866	Angel, Gedaliah,	Gilt Moulding Manufacturers	Commercial St. NE
"	Baham, Wm.	"	21 Upper Rathbone Pl. W
"	Beckmann Bros	"	53 Aldersgate St. EC
"	Fell, William Halford	"	Albert Steam Moulding Works, Wenlock St. N
"	Geck (A.T.) & Moir	"	16 Lit. Trinity Lane, EC
"	Gould Wm, & Son	"	108 London Wall, EC
"	Jacob, Isaac	"	23 & 24 Brooke St., Holborn, EC
"	Linnartz, John Baptiste	"	46 Rathbone Pl. W
"	Louis & Co.	"	15 Crown St. Finsbury EC
"	Macnish, Douglas Macnish & Co.	"	1 Ironmonger Lane, Cheapside EC
"	Marcher, Robt.	"	78 Wells St. Midx. Hospl. W
"	Marriner, Mrs. E	"	28 Chas. St, Midx. Hospl. W
"	Moir, Alex. M. & Co.	"	160 Aldersgate St. EC
"	Pini, Joseph & Roncroni Brothers	"	22 College Hill, Cannon St. West, EC
"	Polack Bros.	"	18 Stephen St. Tottnhm Ct. Rd. W & 2 Queen's bldgs. Tm ct. rd. W
"	Shewin, Hy.	"	51 Fethrston St. City Rd. EC
"	Wood & Lilley	"	31 Crown St., Soho, N
"	Zeitschel, Ernest & Co.	"	19 Peter's Hill, EC
"	Zorn & Co.	"	120 London Wall EC, & 56 Fore St. EC
1868	Alexander, Francis	Gilt Moulding Manufacturers	103 Leadenhall St., EC
"	Blackburn, Johnston & Co.	"	78 Wells St., Ox. St. W & 92 Dean St. Soho W
"	Blandford, William	"	21 Bouverie St. EC
"	Engert, A.C. & Co.	"	31 & 32 Tabernacle Rw. EC
"	Gessell & Lea	"	28 & 29 Gt. Sutton St. EC
"	Griesselieh, Nebel & Co.	"	59 Basing Hll. St. EC
"	Harris, J.E. & H.E.	"	21 Great Alie St. E
"	Hemming, Geo.	"	15 Brownlow St. Hobn. WC
"	Harwood, Wm.	"	3 Arthur St. Ox. St. WC
"	Jackson Geo. & Sons	"	49 Rathbone Place
"	Kreglinger, Adolphus & Co.	"	122 London Wall, EC, & 82 Coleman St. EC
"	Lipschitz, Selig	"	15A by. St., Bishopsgate, EC
"	Scully, Richd.	"	25 1/2 Gee St. Goswell Rd., NE
"	Seehof, Chas.	"	62 Sun St. Bishopsgate EC

"	Thompson, Petr. & Edwd.	"	33 Aldermanbury, EC
"	Walby, James	"	25 Portpool Lane, EC
1868	Cocquerel, Eugene	Composition Ornament Makers	Comcl. St. Spitlflds, NE
"	Hemming, Geo.	"	15 Brownlow St. Hobn. WC
	Mazzoni, Alfd.	"	25 High St. Blmsbry WC
	(Incomplete listing)		
1870	Brooks, Wm. & Son	Composition Ornament Makers	14 Great Queen street WC
"	Brown, George & Alfred	"	24 & 25 Newman st. W
"	Criswick & Dolman	"	6 New Compton st. WC
"	Jackson, George & Sons	"	49 Rathbone place W
"	Mound, Lucien	"	New inn yd. Tottenhm ct.rd.
"	Odell, Henry George	"	51A Rosoman street
"	Parlby, Josiah	"	34 Rathbone place W
"	Smart, William	"	41 Clifton street, Finsbury EC
"	Sully, George	"	16 Clerkenwell green EC
"	Taylor, Jonathan	"	2 Market place, Oxford st.
"	White & Co.	"	49 & 50 Gt. Marylebone street
"	Wood, John & Co.	"	Canal road, Wharf road
1875	Bowden & Dorell	Composition Ornament Makers	Cavendish mews. Charlotte street W
"	Brooks, Wm & Son	"	14 Gt. Queen Street WC
"	Brown, George & Alfred	" (Also listed as Carton Pierre Makers)	24 & 25 Newman st. W
"	Criswick & Dolman	"	6 New Compton st. WC
"	Cunningham, George	"	Acton St., Kingsland rd., E & 381 K. R. E.
"	Jackson, George & Sons	"	49 Rathbone place W
"	Leigh, Andrew	"	33 Fieldgate st. Whitechapel E
"	Odell, Henry George	"	51A Rosaman St, Clerkenwell, EC
"	Parlby, Josiah	"	34 Rathbone place W
1875	Becker	Gilt Moulding Manufacturers	5 Sth. St. Finsb. EC
"	Beckman Bros.	"	27 Cowcross St. EC & Duke St. Smithfield EC
"	Blackburne, Johnston & Co.	"	78 Wells St. Ox. St. W; Factory, 92 Dean St. Soho W
"	Emdin, William Henry	"	52 Newgate St., EC
"	Engert, A.C. & Co.	"	31 & 32 Tab. Row & 75 City Rd. EC
"	Halls, Fred.	"	65 Berwick St., Soho W
"	Hieronimus, William	"	53 City Road EC
"	Jackson, George & Sons	"	49 Rathbone place W

"	Jacob & Penso	"	23 & 24 Brooke St. Holborn EC
"	Nosotti, Charles	"	397-399A Ox. St. W; 1-4 St. Chapel st., 90 Dean St., W & Portland Mews W
"	Trenner, Samuel	"	25 Red Lion St., Holborn WC
"	Zappert, Adolf & Co	"	19 Comrel St. Shorditch E.
1880	Bowden & Dorrell	Composition Ornament Makers	Cavendish mews, Charlotte street W
"	Brooks, Wm. & Son	"	14 Great Queen street WC
"	Brown, George & Alfred	" (Also listed as Carton Pierre Makers)	24 & 25 Newman st. W
"	Cunningham, George	"	25 Brampton road, Cassland road, South Hackney E
"	Dolman, Reginald & Son	"	6 New Compton st. WC
"	Hughes, Thomas	"	21 Cardington st. NW
"	Jackson, George & Sons	" (Also listed as Carton Pierre Makers & gilt border manufrs. Patentees of the canvas plaster; exhibition medals, gold medal, Paris 1778; Paris 1867; London 18862; Paris 1855; London 1851)	49 Rathbone place W
"	Leigh, Andrew	"	33 Fieldgate st. Whitechapel E
1881	Albu, Solomon	Gilt Ornament Manufacturers (incomplete listing)	1 Great Prescot St. E
"	Becker	"	5 Sth. St. Finsb. EC
"	Beckman Bros.	"	27 Cowcross St. EC & Duke St. Smithfield EC & factories in France, Germany Belgium. Patterns & catalogues on appl.
"	Engert	"	31 & 32 Tab. Row & 75 City Rd. EC
"	Hieronimus, William	"	77 & 78 Leonard St EC
"	Hildesheimer, S & Co.	"	14 & 15 Silk St. & 8 & 9 Chapel St. Whitecross St. EC
"	Hill Bros.	"	52 Praed St. W
"	Jackson, George & Sons	"	49 Rathbone place W
"	Moses, Samuel & Son	"	57 Commercial St. E
"	Nosotti, Charles	"	397-399A Ox. St. W; 1-4 St. Chapel st., 90 Dean St., W & Portland Mews W
"	Sanderson Arthur	"	52 Berners St. W
"	Sturberg, J. & P. & Watt	"	35 Coleman St. EC
"	Zappert	"	25 Commercial St. E
"	Zorn, Balnson & Co.	"	9 & 11 Garrick St. Cov. Gd. WC

1881	Engert, A.C. & Co.	Carvers and Gilders (incomplete list)	Offices and manufactory, Three Mills Lane, Bromley-by-Bow, E & depot, 75 City Rd., EC; manufs. of patent machine made ornamented mouldings
1886	Morrell, Hyman	Moulding Manufacturers (40 listed & long list of Gilt Moulding manufs.)	17 & 18 Gt. St. Andrew St. WC
1886	Engert, A.C. & Co.	Picture & Looking Glass Frame Makers (incomplete list)	(wholesale) 31 & 32 Tabernacle Rw. EC
"	Brown, George & Alfred	"	24 & 25
"	Gessell & Lea	"	28 & 29
"	Goslett Alfred & Co	"	(wholesale)
"	Gould & Son	" (also listed under picture dealers & importers)	108 London Wall
"	Morrell, Hyman	"	17 & 18 Gt. St. Andrew St. WC
1886		Very small list of 8 compo ornament makers	
1886	Morrell, Hyman	Carvers and Gilders (incomplete list)	17 & 18 Gt. St. Andrew St. WC
"	Morant & Co.	"	91 New Bond St. W; 47 Woodstock St. W; by appt. to Her Majesty (etc.)

Guide to Directories

1774 *The Gentleman & Tradesman's Daily Journal* Composition ornament makers not found.
1881 *Bailey's Northern Directory*
1884 *Bailey's British Directory. L.D.D.*
1786 *Lowndes's London Directory & Guide* Composition ornament makers not found.
1790 *L.D.D. Universal British Directory*
1793 *Universal British Directory*
1795 *Kent's Directory* Composition ornament makers not found.
1799 *Holden London Directory,* 2nd edn
1802 *Holden London Directory*
1805,6 & 7 *Holden's Triennial Directory*
1809-11 *Holden's Triennial Directory*
1820 *Robson's London Directory*
1823-4 *Pigot & Co.'s London Directory*
1828 *Pigot & Co.'s London Directory*
1850 *London Post Office Directory*

1870 *London Post Office Directory*
1880 *London Post Office Directory*

Date	Patent Description	Patent No.	Patentee
7th March 1693	Making a composition with wood to run liquid into moulds; useful for beautifying rooms and embellishing cabinets &c.	317	Marshall Smith Thomas Puckle
27th July 1765	Composition or stone-paste, made with oils and other things, for the covering of walls, roofs and domes, and for other purposes.	834	Reverend David Wark
6th March 1766	Composition or cement, called 'pietra-cotta'.	841	Dennis McCarthy
3rd April 1772	Composition applicable to the purposes of carving, casting and modelling; 'artificial wood'.	1011	William Whitlock Willian Hodgson
3rd April 1773	Cement for building purposes.	1040	John Liardet
14th Feb. 1774	Ornamenting furniture.	1065	Jospeh Jacob, Junior
14th April 1774	Chasing frames for pier-glasses, in lead..	1068	William Storer
10th Nov. 1774	Making ornaments, such as arms, supporters, boarders, cyphers and flowers, for coaches and carriages, to be pierced on copper or other metallic or composition plates, and afterwards painted, gilt, glazed, bronzed, inlaid or coloured, and contrived so as to be put on or taken off as occasion may require.	1085	John Hatchett
29th March 1777	Composition for covering the fronts and tops of houses and buildings, and for ornamenting the same, and for other purposes.	1150	John Johnson
7th Nov. 1786	Ornamenting picture frames and other kinds of furniture with carved and moulded glass in relief, plain or coloured; applicable to many purposes.	1568	Thomas Rogers
14th Dec. 1786	Making mouldings and ornaments for rooms and ceilings, and for other purposes.	1576	Obadiah Westwood
19th Dec. 1786	Making looking-glass frames and picture frames.	1577	Valentine Gottlieb
27th Feb. 1793	Apparatus by means of which several drawings may be contained and exhibited in one frame.	1934	James Hitchcock

19th Nov. 1803	Application of machinery for striking mouldings.	2742	James Bevans
22nd March 1810	Machine for making mouldings, beads and other articles, of clay, loam, or similar materials.	3319	Johann George Deyerlien
31st Oct. 1812	Making picture-frames; frames for pier and other glasses.	3609	Bejamin Cook
19th July 1817	Making a cement or composition for ornaments and statues, for making and cementing artificial bricks, tiles, and stones, and for erecting, covering and decorating buldings; mixing, working, and moulding the same upon any sort of materials, or working & moulding entire erections and substances therewith.	4144	Peter Hamelin
18th March 1823	Making metallic and other mouldings for ornamenting furniture.	4765	William Bailey Thomas Horne
1825	Composition of wood and other substances.	5202	Charles Adrien Malo
28th August 1828	Making picture-frames.	5691	Benjamin Ager Day
5th Aug. 1830	Manufacture of fancy ornaments and figures (from caoutchouc). Also under "India rubber & gutta- percha".	5970	Thomas Hancock
10th April 1839	Preparing mouldings and producing the effect of chasing or embossing devices or patterns on frames and other work.	8029	James Clement
13th Aug. 1839	A new covering or plating for house hold furniture, picture-frames, cabinet and fancy work, and other articles of domestic or personal use; mode of making such covering or plating (preparing skins of animals, also old parchment, for veneering purposes).	8193	Henry Brown
15th April 1840	Apparatus for suspending paintings.	8471	William Potts
17th August 1840	Manufacture of frames.	8605	John Young

8th March 1841	Manufacture of picture & other frames; applicable to other useful & decorative purposes (by means of voltaic electricity).	8865	Thomas Spencer
4th March 1842	Composition for ornamenting picture-frames and articles for interior and other decorations.	9275	James Clements
26th Jan. 1843	Suspending swing looking-glasses and other articles requiring like movements.	9601	Charles Frederick Bielefeld
25th May 1843	Apparatus for regulating the inclination of looking-glasses.	9740	Sarah Beadon
5th October 1843	Plastic composition applicable to the fine arts and to useful and ornamental purposes (for cement).	9900	Margaret Henrietta Marshall
10th Oct. 1844	Preparing materials for making picture and other frames.	10,344	Joseph Eugene Chabert
22nd Oct. 1844	Apparatus for suspending looking-glasses and other articles.	10,361	George Osmond
10th Feb. 1845	Construction of apparatus for cutting ornamental forms, beads recesses and mouldings, in wood, stone, &c.	10,517	William Irving
21st June 1845	Plastic manufacture or composition, part of which is applicable to decorative and useful purposes and part as a fireproof cement or plastic.	10,489	William Yates Denis Dolan
9th October 1845	Manufacture of cements and other plastic compositions; machinery used in the process.	10,863	Edward Patrick Emerson
18th March 1846	Machinery and processes for pressing and moulding plastic materials.	11,136	John Longbottom
30th June 1846	Cornice ornaments.	11,276	James Hastings
19th Nov. 1846	Manufacture of articles where india rubber or gutta percha is used (manufacture of picture frames).	11,455	William Brockedon Thomas Hancock
8th Feb. 1847	Machinery for working mouldings.	11,564	Thomas Brown Jordan

22nd May 1847	Regulating motion and controlling friction in the joints and other parts of furniture, machinery, and carriages (rendering looking-glasses adjustable).	11,706	Charles Chinnock
23rd Feb. 1848	Apparatus for cutting or carving ornamental forms in wood, stone, and other materials.	12,073	William Irving
29th July 1848	Apparatus and machinery for giving shape and configuration to plastic substances. (Also under "India rubber & gutta-percha).	12, 223	Charles Hancock
26th April 1849	Manufacture of picture-frames and other articles in dies or moulds; also producing ornamental surfaces.	12,587	Charles Iles
27th April 1850	Manufacture of pipes from plastic materials.	13,064	William Gilbert Elliott
20th June 1850	Forming and moulding plastic substances, and apparatus employed therein (manufacturing gutta-percha and similar plastic materials into beadings. or mouldings; cutting pattern moulds for the purpose).	13,146	John Hunt
29h Oct. 1851	Moulding, casting, ornamenting and finishing articles and surfaces (ornamental bricks).	13,791	William Adolphus Biddell & Thomas Green
29th April 1852	Machinery for pressing or moulding certain substances; applicable to moulding or pressing other substances (making boxes for containing pens by means of a composition of gutta-percha, farinaceous amtter and woody fibre, either or both). Also under "India-rubber & gutta-percha".	14,098	John Hinks Eugene Nicolle
6th, July 1852	Plastic composition applicable to manufacturing purposes (compound of Roman cement and gutta percha).	14,207	Alfred Henry Gaullie
17th May 1855	Moulding papier mache tea-trays, picture frames, &c.	117	F. D. Blythe
18th May 1866	Moulding picture frames.	1407	R. Gessell & A. Lea [Pohlmann, G., & Dalk, J.] Provisional protection only
13th Oct. 1868	Moulding mouldings for picture frames, looking glasses, & c.	3130	H. C. Clifton

11th Feb. 1869	Moulding mouldings for picture frames & c. Pieces of wood, fashioned to the general form required and coated with size, are passed under a vessel containing composition, which is either pressed or allowed to flow through an orifice, in a thin sheet, on to the wood.	433	A. C. Engert
5th June 1869	Moulding mouldings. Relates to a machine for making plain and ornamental mouldings and ornaments for picture frames &c. by laying a plastic composition upon wood strips.	1746	A. C. Engert
22nd Sept. 1876	Moulding mouldings; pug-mills... a machine for making composition ornaments in a continuous manner and applying them to moulding such as are used for picture frames... .	3664	R. Scully
11th Dec. 1880	Ornamental plastic mouldings. Relates to the manufacture of mouldings of carton pierre &c. by means of circular or segmental dies of electro-deposited metal, strengthened by a backing of plaster of soft metal and an additional backing of hardwood.	5183	P. Bedeau
4th Feb. 1880	Moulding wood substitutes. By this invention, sawdust, wood shavings and fragments & c., leaves, twigs, hay, hemp., &c., and other vegetable matters, with or without resinous matters or animal matter, such as old leather, hair, horn, &c., are converted into an artificial wood by submitting them to pressure (preferably hydraulic) in moulds, and heating.	(no number provided)	C. Varrot
20th Nov. 1882	Moulding pulp. Relates to the production of architectural ornaments, wall and ceiling decorations, and other moulded articles from wood and other fibrous pulps.	5508	L. A. Groth
5th Nov. 1886	Moulding pulp to form long ornamental and other mouldings. Relates to a continuously working machine in which the pulped material, after some preliminary treatment, issues in a stream and passes between a succession of rollers whereby it loses its moisture and finally becomes moulded into the desired form.	14,300	A. G. & O. G. Hoehre
18th July 1888	Moulding picture frames &c. Frames for pictures, mirrors, panels, bas-reliefs, clock faces, & c. are made from wood pulp or other material as follows.	10,422	F. L. Lawrence
19th Sept. 1890	Moulding mouldings. Electric wries embedded in an ornamental moulding of plastic insulating material are produced by forcing the wires and material through a die in a continuous column.	14,830	F. Walton

10th Dec. 1890	Moulding bars, columns, &c. The invention has for its object the production of ornamental devices upon the surface of bars, rods, columns, or plates of any material capable of being moulded by pressure, or upon an outer covering of plastic or impressionable material.	20,179	J. Heckhausen & J. Weies
11th Sept. 1896	Moulding mouldings for picture frames &c.	20,126	O. Liepmann

Appendix Three:

Transcripts of Entries within the Ledgers of the Firm of Jackson's, William Saunders and John Smith

Details of the Jackson family from the St. Marylebone census of 1821 are included.

References

Jackson, Day Book, 1804, George Jackson Archive, Mitcham.

Saunders, William, accounts and receipts for services and materials supplied to George Romney and others 1783-1799, National Art Library, MSL/196514463.

Smith, J., Day books with indices of buyers, 1 January 1812-12 March 1867, National Art Library, MSL/193612592.

Select Transcripts from the Day Book of Jackson's (1804)

A selection of names from the ledger index are listed below, with their page references in the ledger. Some of the names are crossed out as indicated. Entries finish in 1818.

Allsop	467
Adams	364-374
~~Brown~~	~~23~~
Brown John St.	33-40-47
Brown Pulteny SR (St ?)	315
Baines Harp Y (?)	449
Cribb & Son	153-51
Delour	229 236-253-351-487
Dolman & Son	473 -19-24-25
Eckford	191-51-101-128-129-138-149
~~Edson Great Titchfield St~~	~~123~~
~~Evens~~	~~127~~
Elliot Bond St	128
Ford	262-428

Freeman	27-206
Green	50-80 352 441
Goslet (sic)	209-253 233-415-179-182-200-206
Green	154-168-431-420-230-240-243-243
Goslet	207-211
Green	247-254-255-260-261-263-305

(Many of the "H"s are crossed out and may be older names with whom Jackson's had ceased trading.)

~~Jackson~~	~~76~~
~~Jenks~~	~~78~~
Jackson Father	158-270
Jennins	298
Jordan & Evans	152
Johnson 437 Gloucester St	
~~Mr Thos Kent Baldwins Gardens~~	~~87~~
~~Knox~~	~~46-49-179~~
Linnel	244
Langford	33
Legg	286
Leader	226
Laurence	299-479
~~Moore Smithfield~~	~~126~~
Milbourn	202-327-313-371
Legg	73
Maddox	423
Newman	74
~~Pots & Co~~	~~125~~
Paley	214-239-313-328-328-416-349
	205,260 260 –
Pitts	208
Ponsonby	252-323-335-430-348-486
Sibley	28

Sample entries from the ledger.

(p. 251)

1817-	Mr Green from 260	£ s d
Nov[r]		
10-	25 ft of Fisher Strap	- 1 6
	25ft 3[m] Old French leaf	- 6(1)?
11	8 Pateras	- - 6
	2 Do	- - 6
	3 Roman Bands	- - 6
14	1 Set Smarts top Corners & turets (sic)	- 2 8
	1 Set leaders Corners & foliages	- 4 -
15	- 4 ft laurel	- - 2
18	7 Roman Bands	- 3 -
22	1 Set corners & tusets (sic)	- 2 6
26	- Cheq & frame	- 2 -
Dec[r]	1 set top Corners & turets (sic)	- 2 6
3	6 ft. Poppy	- - -
	25 ft of Bubble	- 1 -
	2 Set of Leader corners & fan foliage	- 8 -
	4 Pateras _____	- - 2
	Carried to 263	

	Mr Adams	
1817	Brought from 364	2 4 6 3/4
July 7	4 small husts	- - 4
	8 ft of M size Oak	- 1 4
8	1 Set of leader's Corners	- 2 -
"	4 Flat smooth pieces of Composition about ½ lbs	- - 6
9	2lbs of composition 4 Smarts large husks	- 2 4
13	Fringe for 1 Cushion	- - 4

25	1 ft of Oak 2 lb of Composition	- 1 1 1/2
Novr 26	1 ft of Egg & Tongue	- 1 5 1/2
	3 ft of Fringe	- - 9
	2 lb of Composition	- 1 -
Dec 5	5 ft of egg 4 mitres	- - 5 1/2
9	18 Stars	- - 6
	12 ft of water leaf	- - 9
15	6 Stars	- - 2
20	2 ft of egg	- - 1 1/2
	2 Pairs of fan foliages	- - 4
30	6 Stars	- - 2
1818	8 (?) ft of egg	- - 1 (?)
Jan 10	20 ft of Small egg	- 1 3
	4 ft of Fringe	- 1 4
	2 ft of Rope	- - 2
	12 Stars	- - 4
14	1 lb of Composition	- - 6
20	1 fringe	3 1 3 3/4
20	1 fringe	- - 4
Feb 7	2 ft egg	- - 6
5	6 ft of egg	- - 4 1/4
	½ ft compo	- - 3
		3" 2" 8 1/4

(p. 226)	Mr Leader	
March	Makg 1 frame 23 ft of 9 ½ Bold m	4 6 3
29	Sweeping & Ornamenting Do Compleat (sic)	5 10
		9 16 3

(p. 191)

1815	Mr Eckford Watn (sic) Lane	
Nov 25	Making 1 miniature (?) frame Witing Chequing	
	Ornamenting & Sweep & Cutting // through D^{o}	1 2 -
Dec^{r} 6	Making 2 frames 20ft of 5 ¼ m	1 10 -
	Witing D^{o}	- 13 4
	Chequing (sic) D^{o}	- 9 -
	Ornamentg Sweeping & cutting through	
	D^{o} 16 Holes	3 2 -
	Makg 2 D^{o} 19 ft of 5 ¼ m	1 9 -
	Witing D^{o}	- 13
	Chequing D^{o}	- 9 -
	Ornamenting, Sweeping & Cutting throug (sic)	
	D^{o} in 16 places	3 2 -
	Mak^{g} 1 frame 6 ft 9 of 4 ^{in} m-	- 6 9
	Witing D^{o}	- 3 4
	Chequg (sic) D^{o}	- 3 -
	Ornamenting Sweepg, & Cutting D^{o} through	- - -
	In 24 places	1 2 -
	Mak^{g} 1 frame 6 ft of D^{o} –	- 6 -
	Witing D^{o}	- 3 -
	Chequing D^{o}	- 2 6
	Ornamenting Sweep^{g} & Cutting Do through	
	In 24 places	1 - -
		15"15"11
	Discount for money	15
	Paid	

(p. 22)

1812	Mess Nash & Co. Dover St.	
Sept^{r} 17		
	148 ft Roman leaf oge (sic) @ 5(4)^{d}	3 1 4
	186 ft Rafle (sic) leaf oge @ 3	2 6 6
	126 ft Rose leaf oge and Square 2 ½	1 6 3

	250 ft Beads	1/2	- 10 4
	12 ft Acorn Ovolo	2	- 2 -
	4 Lions Heads		- 1 -
		Paid	£ 7" 7" 9

(1812 continued)

	Mr Thompson Oxford St.	
	7 ft Purple Brown	- 10 6
	1 Old Flight of Stairs	1 1 -
1812 Dec 4	1 ft Parchment	- 1 -
1813 May	20-2 Patterns Pattera Block to cash from	- 5 -
June 9	1 Gothic Patterns to Shew 2 faces –	- 5 -
10	1 D° D° –	- 6 -
Oct^{ob} 20	2 ft Parchment	- 2 -
Dec^{r} 11	7 ft Glue (sold in strips)	- 3 9 $^{1}/_{4}$
July 3rd	2 ft Parchment	- 2 -

(1805)	Mr Brown	
June	1 „ ___ „ ____ of Glue	5 5 -
26	1 bag _____ Paid	- 1 -

(1805)	M. Jackson Father	
Octb^{r} 24	2 Frames for Saunders	
	Cutting 2 Lenths (sic) of Flowers	- 12 -
	Cutting 1 Corner leaf for D°	- 17 -
	Cutting 1 Corner Husk for D°	- 4 6
	Ornament^{g} 2 Old frames for D°	
	With Corner Centres 7 Smarts & Bowers foliage	
	1 frame for Guillit	
Nov^{r} 2	2 frames for Gi(e)rrod	

	2 D° for C(?)	
7	2 D° for Woodbourne	
9	2 Setts (sic) Large New Corners	
	Cutting 1 Raffle leaf	- 3 6
	D° 1 Shell	
19	1 frame Enlarg[d] 18 ft ready money	- 10 -
24	1 D° for Guillit	
	1 D° for Ponsonby	
	Laying on 2 Setts Large leaves on }	
	2 Old frames for Saunders }	- 12 -
	8 Ovel (sic) shells for D° }	
	30 ft Raffle leaf & Tongue on D°	
27	1 Large frame Temples Corners & Centres & c.	
Dec[r] 2	1 frame for Woodbourne	
4	1 D° for Woodbourne	
	Trimming 2 Setts Large Corners	
	1 Roman Band Cut Larger	- 5 6

1816	Ford	
June		
24	10 ft of his own Moulding	- - 7 ½

Entry for Jackson, 50 Rathbone Place from the St. Marylebone Census (1821). City of Westminster Archive

Families occupying House = 3
Males in the House including Children (exclusive of soldiers & sailors) = 3
Females in the House including Children = 11
Families in the House chiefly employed in Trade, Manufacture or Handicrafts = 2
Families in House not included in last Column = 1

Ages of males
}10-15 = 1
}15-20 = 1
}40-50 = 1

Ages of females
}under 5 = 1
}10-15 = 2
}15-20 = 2
}20-30 = 3
}40-50 = 2
}50-60 = 1

Brief Extracts from the Day Book of John Smith VIII

(1812)
(The type of gilding and finish is frequently referred to. For example, the number of books of gold required to complete a particular job):

"A large handsome frame…richly ornamented at the corners 13 in with (Blundels) bead & space at the back Egg & Sharp strap….front gilt in oil Gold. 22 bks – time from the compo 7 days -."

Carving is also mentioned in this year:

" with Carv'd foliage corners & shells…like one made before".

(1812)

The time taken to complete various stages is stated and a break down of costs:

" French foliage leaf".

" To Two large handsome frames…..Greens ornamt, water leaf & bead one cont – 'g 17ft the other 14 ft Gilt in Oil Gold etc: 16" 17" –

(1812)

As with the previous entry, it seems that in the same year, compo ornament was far more common:

"Frames….richly ornad with Temples band my corners Egg mg with inside Oval Tarn'd Spandrils enrich'd with Blundels Dolphin ornament…"

"….richly ornad with Moselys corners…with bubble Bands, Pratts shells & part of Bowers corner…"

"….& Jacksons large Shells…"

"…Smarts corners/middles….& french ornad scrools…taking from the compo 22 days in the whole 27 days Gold 14 books."

27 days……	7	3	-	
Wood work……	1	2	-	
Compo ornats……	1	18	-	12. 4. -
Gold……	1	16	-	
Materials……		15	-	

"Self & Mens time" (Smith himself worked on objects).

(p. 12)

(Black & gold frames ornamented with brass for prints are mentioned quite frequently.)

(1814) "...Freemans Gothic flower..."

(1816) "...Woodburns French bands".

(1917) "...Leaders scrools & small scallop shells".

(1818)

"Put g on inside flat ornt to an Antwerp frame and Gild y Do in Oil - ..."

(This indicates the common practice of altering and/or modernising frames, to which compo was ideally suited.)

(1819) "Wilton pat(tern)"

(1820) "Woodburn's shells."

(1821) "...bound with Rufsia Corners" (probably refers to a portfolio)

(1821) "Leaders Corners."

Jackson can be found in one of the last entries for 1821:

10 March	Mr. Jackson. Rathbone Place =	
Recd	An Iron Chest – Lc.	5 5 -

Transcripts of the Customer Account Book of William Saunders

Saunders is noted as carving in 1783. Prices vary considerably and between 1786-8 a ¾ length frame could cost around £3 to £4, a half length around £5 and a "half Whole length" from around £7 upwards. This seemed to have changed little by the mid 1790s. A "wholelength" of the 1790s could cost around £17. As regards styles, he was still making "Kit Cats" in 1795 i.e. for W^{m}. Egerton. This may indicate that carving styles were old fashioned and that the most up-to-date styles were to be found in the new compo in the early part of the nineteenth century. The ledger is very straight forward, the goods being supplied direct to his customers.

1788 Rec^{d} Mr Romney to Will^{m} Saunders (recorded at 10 Gt. Castle St., Cav. Sq.)

	£	s	d
March Carving & Gilding in Burn g^{ld} }	}		
a Picture frame }	}	1 „	1 „ 8
Meas^{e} 8 (ft), 8 (in) at 2(s) 6(d)_____	}		

1789 George Romney Esq^{r}

to Will^{m} Saunders

	£	s	d
a three Quarter frame for Miss Constables	} 1 „	16 „	_
picture	}		
A case (&) packing do _____		„ 7 „	_
Oct^{r} 20 A frame for M Halsey for picture of Sensibility			
With 2 Slips to do Meas.^{e} 41 feet at 1(s) 4 (d) p foot	} 2 „	14 „	8
A three Quarter picture frame M			
Halsey, (?)	1 „	16 „	_
29 Carving & Gilding in Burnish gold 3	} 1 „	3 „	_
frames	}		
for Heads Measure 14 ft at 20 (d)	}		
a Larger frame for a Venus Meas^{e} 7ft at 2 (s) 6 (d)	_ „	17 „	6
a frame to match gilt in Oil gold 6ft at 20 (d)	_ „	10 „	_
a frame for a Head for M Song_____	_ „	14 „	_
Nov^{r} 20 a frame & glass for Print of Serena	} _ „	9 „	_
For M^{rs}	}		
Fitzherbert_____	}		
May " Carving & Gilding in Burnish gold a	}		
Frame	}		
For Picture of the Birth of Shakespear	} 9 „	15 „	_
Measure 26 ft at_____	}		

Appendix IV:

Notes and Guide to Materials Used in the Northumberland House Saloon

The room was de-installed and labelled by Momart Fine Art Packers in 2000. Several parts from what remains of the Northumberland House saloon (V&A no. W.3-1955) were examined while dismantled during the refurbishment of the British Galleries. Care was taken to record observations on sections that represent the full range of materials used to create relief decoration within the scheme.

Lead and carved sections

Papier mâché sections

Compo sections that may be early nineteenth century

Material that may be twentieth century replacements.

1. Cornice 4624 (a). The rosettes are made of lead. The other ornament is carved wood.
2. Glass section (surrounding a roundel) 4349 (a). All the rosettes are made of papier mâché.
3. Most of the pieces over the glass sections, i.e. 4335 (a), are made of lead.
4. Roundel 4336 (a) is re-gilded as are many of these pieces.
5. Again 4328 (a) has been re-gilded. Traces of the original bole and gilding still visible. The bole is a brick red colour.[1]
6. Over-door frieze 4549 (a). This has applied compo elements in good condition. The colour resembles the "biscuit" colour associated with traditional compo but is slightly grey, thought to be due to layers of dust.

[1] Personal communication, Christine Powell, Senior Gilding Conservator, Victoria & Albert Museum, who assisted in these observations at Blythe House.

7. Cornice 4548 (a). All the ornamentation is compo.
8. Capital 4399 (b). The lower acanthus leaves are made of a courser material, closer to plaster of Paris when compared with compo. The colour is a very pale "biscuit" colour. The frieze to this capital is also made of this material and the top band is poorly moulded. The presence of this material may indicate that these areas are replacements.
9. Capital 4395 (b). The acanthus is more crisply moulded than those in no. 8. The rosettes are also made from the moulding material in no. 8. The pine cone element to this capital appears to be a replacement based on the fact that it is very poorly moulded. The presence of a small hand written label "7N" (verso) may suggest a late eighteenth or early nineteenth century.[2]
10. The capital 4195 (a) looks similar to no. 9. It is labelled "N12" (verso).
11. Capital 4189 (a) is similar to no. 10. It is labelled "N14" (verso).
12. Capital 4256 (c). The acanthus leaves are poorly cast and they have the same re-gild in terms of colour and careless toning to the leaves. The leaves are covered in about 1/8 inch of gesso.
13. Capital 4206 (a). The cross section of the base reveals composition leaves. The colour looks like compo that has aged without the protection of a finish. The label (verso) reads "N°1".
14. Capital 4394 (b) is poorly cast.
15. Capital 4205 (a) of good quality. The label reads "N10".
16. Capital 4398 (b) is poorly cast. Many elements of this part are of an extremely poor quality. Even the carving is badly executed. It is possible that the entire part is a poor replacement.
17. Capital 4255 (c) is a high quality example but without label.
18. Again, the decoration of frieze 4520 (b) seems to be compo of the usual "biscuit" colour.
19. Cornice 4201 (a) and cornice 1063 (a) are all carved wood except for the lead rosettes.
20. The ornament on the base of the pilasters is carved.
21. 4503 (b), a single acanthus design element, is carved.

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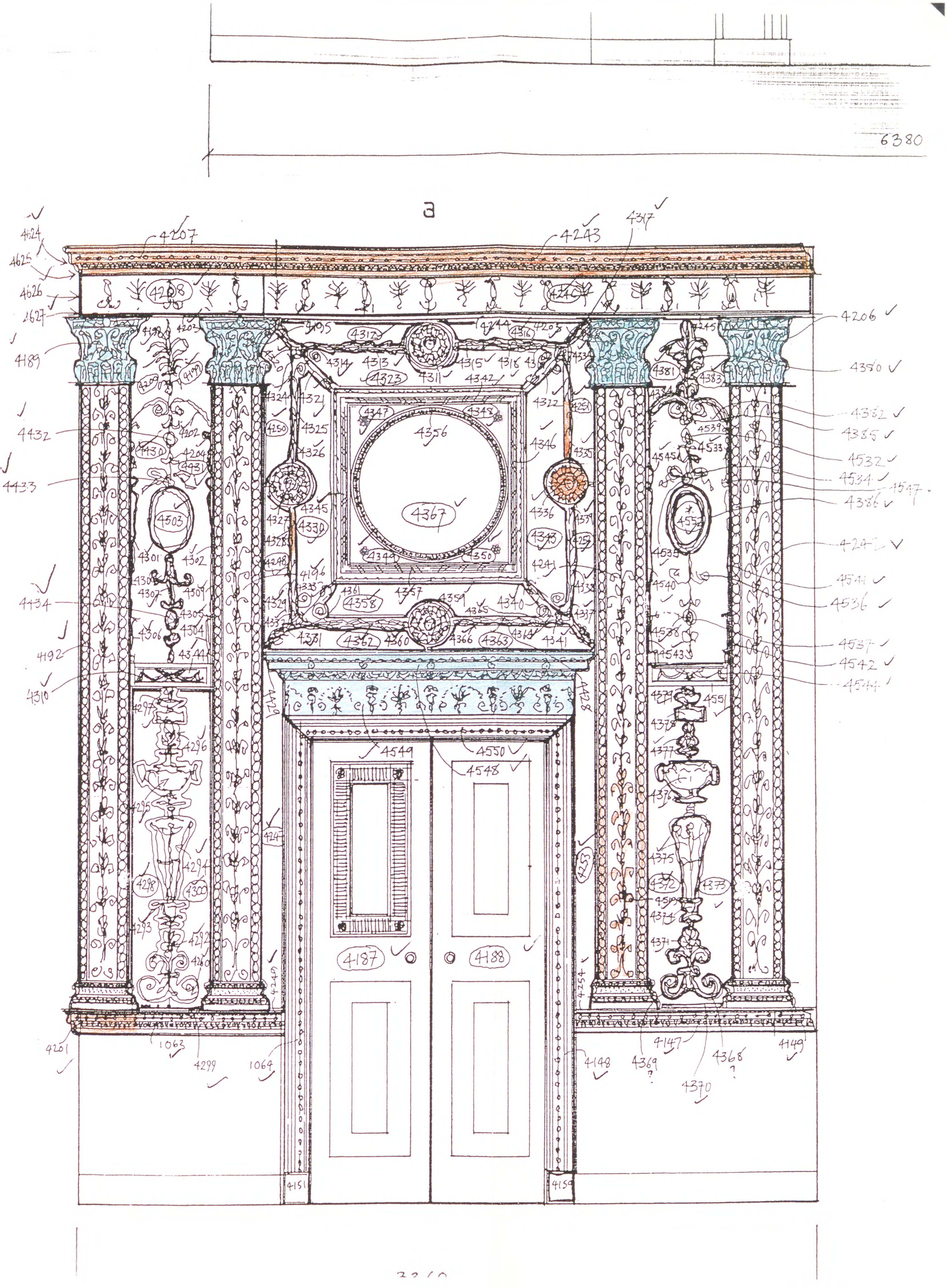
[2] Personal communication, Tim Millar, Furniture Conservator, Victoria & Albert Museum.

22. The round frame 4555 (c) and the two ovals 4441 (b) and 4406 (b) are made of lead.
23. Many of the applied ornaments to the pilasters are made of lead except the square slip mouldings, which are made of wood.
24. There are a few odd replacement sections of ornament covering the surface of the glass sections that are made of wood instead of the original lead.
25. The door casing 4550 (a) is all carved except the rosette band, which is lead.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4243
4317
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4208
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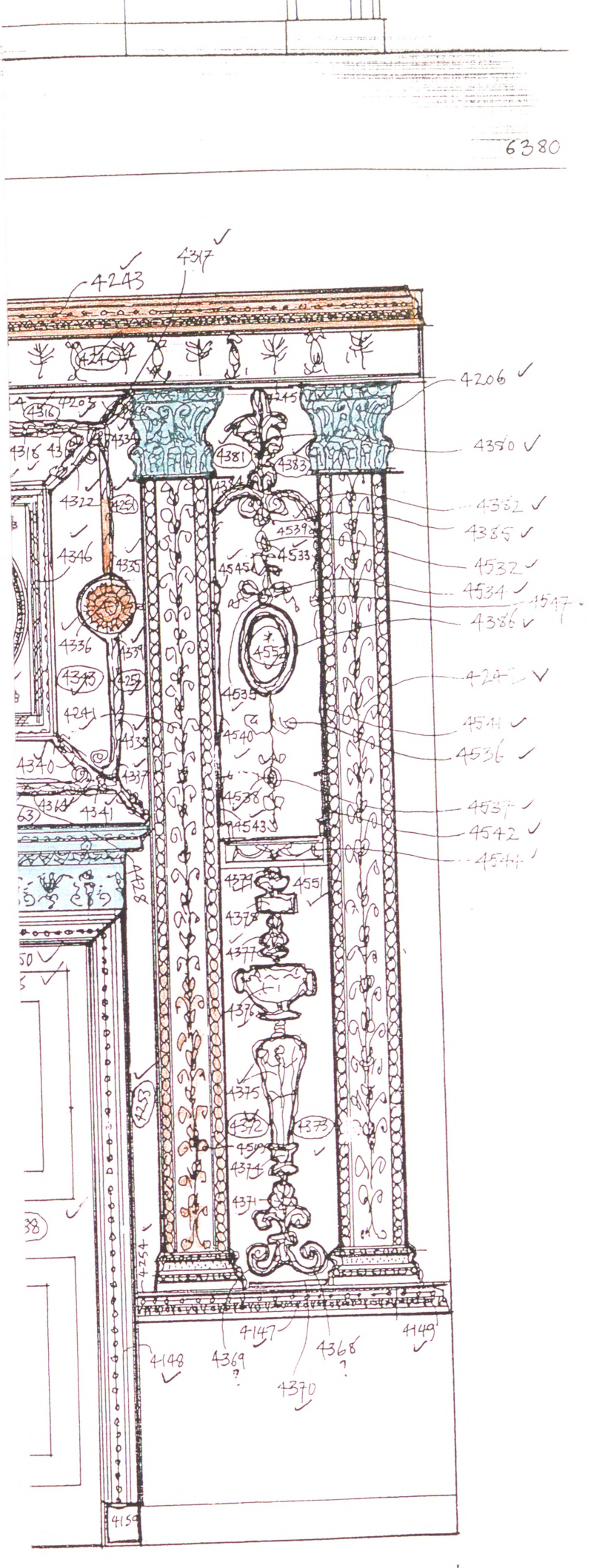
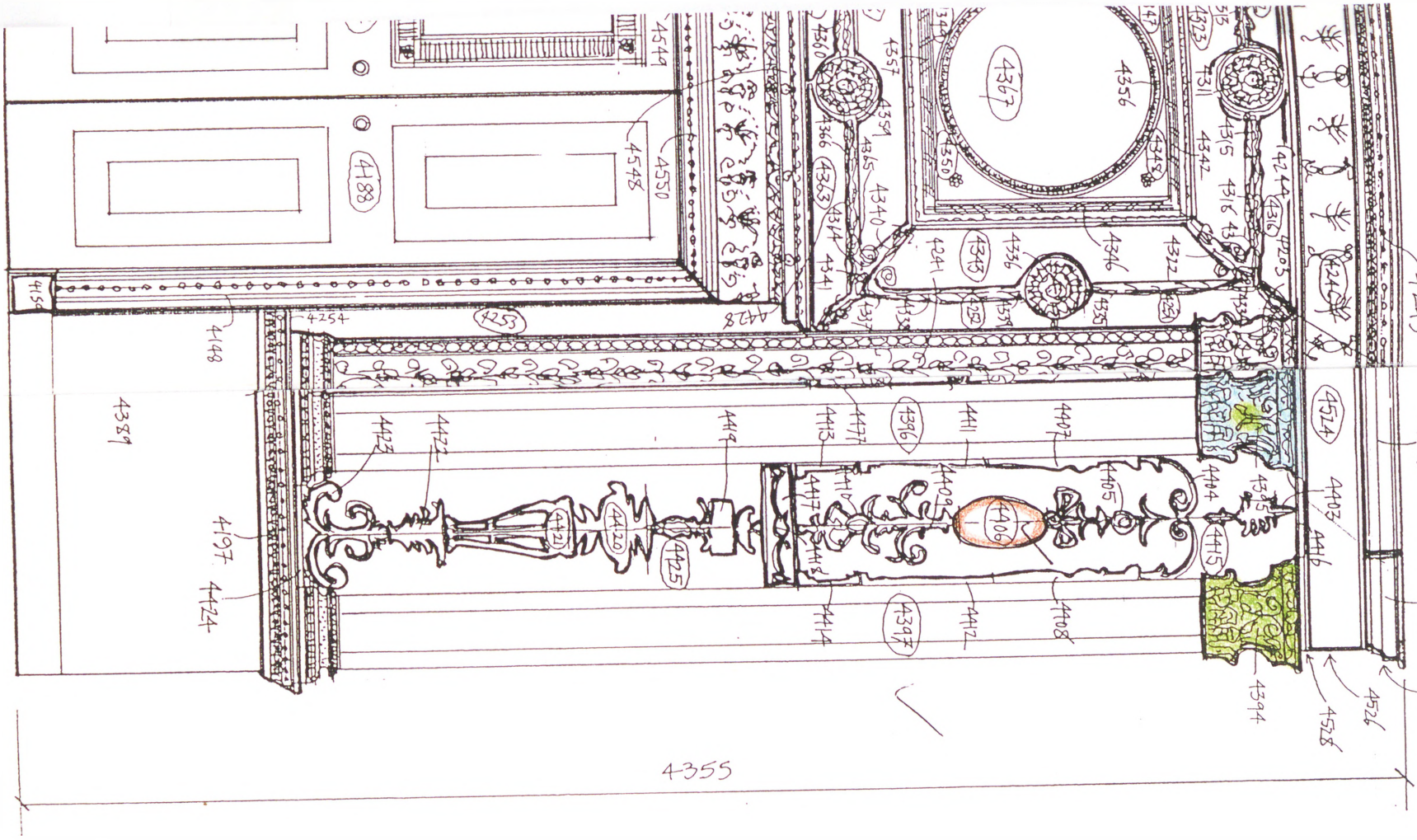
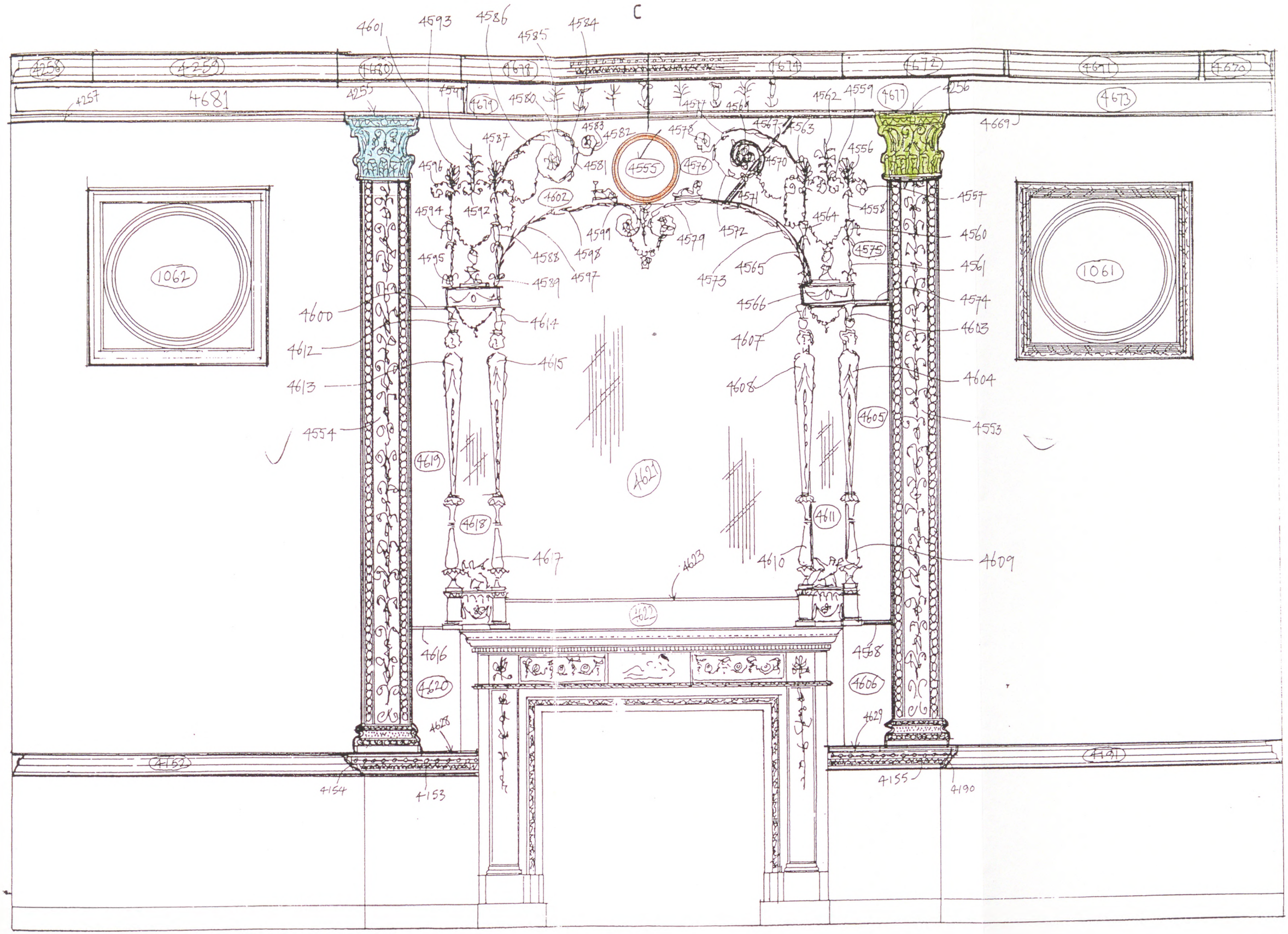


Plan elevation "a" of the Northumberland House saloon, (Victoria & Albert Museum no. W.3-1955) produced by Momart Fine Art Packers when the room was dismantled in preparation for the new British Galleries.


6380
a
b
4355



Plan elevation "b" of the Northumberland House saloon, (Victoria & Albert Museum no. W.3-1955) produced by Momart Fine Art Packers when the room was dismantled in preparation for the new British Galleries.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4611
4618
4610
4609
4617
4623
4622
4616
4568
4620
4606
4628
4629
4152
4154
4153
4155
4190
4191
1062
1061
6330
a
b

Plan elevation "c" of the Northumberland House saloon, (Victoria & Albert Museum no. W.3-1955) produced by Momart Fine Art Packers when the room was dismantled in preparation for the new British Galleries.

Appendix V: Studio-Based Experiments

Introduction

This chapter describes a series of tests conducted in the studio which involved making up samples of compo following historic recipes ranging from the late eighteenth to the early twentieth century and assessing the working properties of the materials produced.

- The primary aim was to become familiar with the process of comparing compo in a workshop environment, the practical difficulties encountered, and the way each ingredient contributed to the end result.

An empirical, non-scientific method of analysis was adopted. This is because there were too many variables governing, not just the compo making process itself, which, as has been pointed out, was akin to bread or pastry making, but, for example, the different sources of the ornament decorating one object (discussed in Chapter Three). Other factors such as the different grades of the main ingredients and their availability are a further consideration, as is the fluctuation in temperature of the workshop. Indeed, it is important to take this approach if a better understanding is to be gained of the actual working process and the physical properties of the material.

With the exception of Jackson's who still guard the secret of their recipe, (to the author's knowledge) no historic samples can be firmly traced to a firm whose recipe is known. Indeed, as no archival record of Jackson's recipe is known to exist, there is no proof that what they now regard as their historic recipe (reputedly used for work under Robert Adam), is the same formula that was used in historic examples of their work.

Various observations are provided on the method of the tests recorded here, including the working properties, colour, texture and changes during the setting process. Experiments were also conducted using a given recipe; then altering the quantity of the four major constituents to assess their respective impact on recipes of this nature. This provides a guide to the importance of each ingredient, the relative skill and accuracy required to make them, and the implications for recipes that may have failed

to adhere to these guidelines. For example, the maker may deliberately have used a recipe that was slightly different because he required that the recipe had particular handling qualities.

The following experiments assisted in the interpretation and assessment of the historical information and are complemented by parallel strands of research involving examination of a range of objects from collections. The notes from a number of these examinations also record observations on the appearance of compo (where it was visible) such as colour, texture and signs of deterioration where they exist. These observations (recorded in appendix six) have been useful in informing certain points within the thesis. Notes on these observations are provided at the end of this chapter.

The Tests

Making compo in the studio, using the four main ingredients described in Chapter One, follows a series of steps which facilitate the combination of all the ingredients to make as smooth and homogeneous a material as possible. These steps are common to modern practice and to the historic accounts of making compo where instructions are provided. It is therefore worth briefly describing this general process before moving on to the account of each experiment.

Generally, the dried glue pearls are soaked over night in enough cold water to cover them completely. The swollen pearls are then heated in a double boiler to form a strong viscous glue. The rosin is melted in a separate pan (a double boiler is not required) with the oil, which assists the melting process in that it provides a liquid into which the rosin can dissolve (**Fig. 135**). They are kept separate from the glue because the rosin takes more time to dissolve with the glue present as the glue melts at a lower temperature. Additional minor ingredients may be added at this point, such as Venice turpentine. Ingredients such as sugar are often dissolved in a little water and then added to the wet ingredients to ensure the grains are fully dissolved.

The warm glue is then combined with the melted rosin/oil to form the compo "liquor" or "juice" (**Fig. 136**). It is important that this is kept as warm as possible before adding to the sifted whiting in a bowl. The usual method is to add the juice (in a similar way to pastry making) to a well in the centre of the whiting and gradually

draw the whiting in with a spoon until sufficient has been incorporated to form a soft pliable mass that can be handled (**Fig. 137**). It will still be fairly tacky at this stage and it is necessary to fold in further whiting, kneading the dough in the bowl with the hands to form a soft, pliable mass (**Fig. 138**). When sufficient whiting has been added (and this is a matter of judgement, as the following experiments explain), the "dough" is kneaded (as rapidly as possible) to ensure the ingredients are fully amalgamated. Before this dough has a chance to cool down too much it is shaped roughly to the side of the oiled mould and pressed (**Fig. 18**). It is important to ensure that the dough is as free of wrinkles as possible (at least on the casting side) as they may not be entirely eliminated with pressure. It is often said that prolonged kneading will aid this problem, but it is frequently the case that the heat of the hands does not counter the gelation process that sets in very rapidly. Therefore, it is usually necessary to reheat the dough, either by traditional steaming, usually over a pan of water, or immersing a plastic bag of dough in warm water. A microwave can also be used, though timing is important. After pressing and trimming, the ornaments can be re-heated before application to the substrate, particularly if it has a curved surface (**Fig. 139**).

With this general account of the process in mind, it is now possible to consider the observations made when making and handling compo according to several historic recipes. It should be noted that throughout the following account, the original texts usually specify either dry weight or liquid measure and these have been divided to form enough dough to make at least three casts from the mould. Where the measurements have not been clearly stated or are open to interpretation, (in the Nicholson recipe of 1823), the interpretation is explained within the method. The original (British imperial) quantities are provided within each test in addition to metric conversions. Weights and measures were taken with a measuring jug and digital kitchen scales. Shrinkage (the overall length from two specific points) was measured in millimetres with callipers but individual results are felt to be difficult to interpret even with comprehensive scientific analysis and therefore average degrees of shrinkage and special cases are recorded in the discussion. The observations on the quality of casts should be interpreted cautiously as a screw-press was not employed to press the compo samples into the moulds.[1] However, as all casts were produced in the

[1] A screw-press was not available and therefore hand pressure was applied.

same way using the same mould throughout, the results all bear relation to each other. The following tests were conducted in a consistently warm room.

1688 George Parker & John Stalker, *A Treatise of Japanning and Varnishing*

Method

This test was made to ascertain the working properties of a decorative "composition", the recipe for which employed neither rosin nor oil. 2 oz [57 g] dry glue was soaked in enough cold water to cover it, according to the less than explicit directions provided in the text: "stronger than any size, yet something weaker than common melted glew (sic)". After melting, this was added to the whiting in the usual way.

Observations and working properties

It was clear as the dough was formed that it would dry quite rapidly as small pieces readily broke off in the bowl of whiting and dried throughout the making process. The dough was kneaded, gradually adding whiting by either dipping the dough or hands in the bowl to prevent sticking. Although still at a workable stage, the dough was perceptibly tough compared to the Westwood recipe. It was therefore necessary to work rapidly to achieve a flat, unwrinkled disk for the mould.

The cast itself released easily and had reasonable detail, however it was partially covered in fine wrinkles and had a slightly coarse texture; it lacked the smoothness of the Millar recipes described below. This is probably due to the lack of pressure from a screw-press. However, in making such cast ornament for frames, Stalker and Parker advise pressing the paste into "all parts [of the mould] with your thumbs [28, p. 62]." The cast was quite firm with small voids or air pockets seen in cross section when trimmed with the knife. The trimming was effected immediately after the cast was taken. However it had become noticeably more difficult to cut after a couple of minutes as it began to dry. The colour was very pale and paler than the Spon recipe from 1909.

1786 Obadiah Westwood (Patent specification no. 1576)

Method

The recipe specified mixing "pieces of linen, silk thrumbs, cotton…or other articles made from or composed of silk, hemp, flax, or cotton, in a raw state, till they are of a fine texture". A piece of cotton brocade was used, adding about two tablespoonfuls of threads cut into 1-2 cm lengths.

This was added to " a strong paste". The patent suggested either: "glue, flour, and water", or "isinglass, flour, and water, or other adhesive ingredients". The former combination of ingredients were used, taking the proportions of the glue and water from the (1874) recipe of C. H. Savory later in this section (the ingredients were divided by 100); 1 $^{1}/_{10}$ oz [31 g] glue soaked in 1 $^{1}/_{2}$ fl oz [43 ml] water respectively. Two teaspoons of flour were added to this mixture.

To this paste of "proper consistency" (interpreted below), should be added "a small quantity of rosin, oil," and "Spanish brown, red lead, or umber, or other binding articles". The rosin and oil were made according to the 1874 formula, dividing by 100 ($^{1}/_{2}$ oz [14 g] rosin to $^{3}/_{5}$ oz fl [17 ml] oil). Whiting was used as the "binding article" (the filler). The melted oil/rosin was added to the paste and this was then added to a bowl containing 8 oz [227 g] whiting in the usual way. Only 1 $^{1}/_{2}$ oz [43 g] whiting were actually used.

Observations and working properties

Only two teaspoons of flour were required to make the glue/water into a thick paste. It was felt that the mixture would be too thick for the whiting, even when the rosin/oil was added if any further flour was incorporated. The inclusion of the threads also seemed to contribute to the high viscosity, which was reduced slightly to form a paste that was too thick to pour, with the addition of the rosin/glue.

This was mixed in the bowl of whiting and very rapidly could be kneaded with ease due to its soft texture and pliability. The dough did not seem to require very much whiting and was of a perfect consistency to apply to the mould with very little kneading, though it was thoroughly kneaded to ensure all the ingredients were

completely amalgamated. It was neither too tacky nor too firm and did not crack and wrinkle when kneaded. The cast was therefore very easy to take and was virtually wrinkle free with a couple of pin-prick sized voids on the ornamented surface, more on the back surface, and several where it was trimmed. The threads could be trimmed successfully with the excess using a sharp knife. The colour was much darker than the other recipes due to the inclusion of the coloured threads.

- The extra ingredient, flour, in this recipe was similar to using an extra adhesive in that it improved malleability in the same way as if the quantity of glue pearls were increased (discussed shortly). However the effect that it may have had on other ingredients is more difficult to quantify. Flour paste was known to Cennini and later used in the lining of paintings from at least the 1750s [29, p. 65; 99, p. 498]. A typical mixture is said to be French rabbit skin glue, heavy wallpaper paste, and Venice turpentine. "Glue without paste shrank too much and did not produce a structurally durable film. The Venice turpentine imparted a little flexibility; also, without it the glue would not have the desired adhesive tackiness or penetration." Therefore it may have been experimentation with a lining adhesive that led Westwood to this formula, though this is just one possibility.

1823 Peter Nicholson, *The New Practical Builder and Workman's Companion*

"It (the composition) is composed of powdered whitening, glue in solution, and linseed-oil; the proportions of which are, to two pounds [0.9 kg] of whitening one pound [0.5 kg] of glue, and half a pound of oil [see below for conversion]."

Method

The recipe was divided by 8 to reduce the smallest quantity to around 1oz [28 g] in the interests of economy. The proportions were therefore 4 oz [113 g] whiting, 2 oz [57 g] glue in dried pearl form and $1^{1}/_{4}$ fl oz [36 ml] oil.

There were a couple of anomalies with the interpretation of this recipe. Firstly, "glue in solution" was specified, however it remained unclear as to whether the "one pound" referred to glue in solution or dry weight. It was interpreted as the latter (the

customary interpretation in cooking), and enough water was added to cover the glue pearls to soak prior to heating. The second anomaly was the oil of which "half a pound" is cited. It may have been that one scale was used within the workshop environment and thus all the measures may have been dry weight. With this possibility in mind, the oil could have been calculated as a dry weight measure with 16 oz [454 g] to the pound. However, it was calculated as a liquid measure with 20 oz [568 ml] to the pint as there was no clear indication of the correct interpretation. When ½ lb [227 g] raw linseed oil was weighed as a dry weight, its volume measured 8 $^{7}/_{8}$ fl oz [252 ml] as opposed to 10 fl oz [284 ml] ($^{1}/_{2}$ pint) and thus divided by 8, would be 1 $^{1}/_{10}$ fl oz [31 ml].

Observations and working properties

Instead of adding all the ingredients in a vessel as specified, it was eventually decided to add the oil to the warm, melted glue in a double boiler to make the compo "liquor". This was because the specified method formed a slightly lumpy textured dough, (although the compo mixture formed quite readily as it was mixed over heat) despite the fact that the whiting was well sifted.

After a few seconds the oil amalgamated with the glue, forming a slightly glossy, opaque, deep golden, heavily viscous liquid. The oil also rendered the glue less sticky so that it did not adhere to the sides of the vessel and formed a quite stable emulsion. When this emulsion was added to the bowl of sifted whiting, it was noted that the residue dried to a tough gel in a similar way and time to that of neat glue. The liquid was then added to the whiting in the usual way and the mould, when filled was turned onto a wet board and pressure applied (by hand).

The actual working time from kneading the dough to pressing it into the mould seemed very short; approximately 2 minutes. Upon kneading, the dough began to gel very quickly, just as soon as enough whiting was added to prevent it from sticking (and despite taking great care not to add more than was necessary). The temperature of the room was also very warm and it is felt that some experience and practice is required at this stage to produce a fine and accurate pressing without the material either sticking to the mould or becoming hard before a pressing can be made. The resulting cast was thus fairly detailed but with a slight lumpy appearance to the

surface; there were a couple of very fine wrinkles to the decorative surface and more on the back. It was also of still flexible but very firm consistency and there was evidence of the outer surface drying and hardening after only 1 hour.

1874 By a Practical Hand, *The Carver and Gilder's Guide and Picture Frame Maker's Companion*

7lb [3.2 kg] best glue
7 ½ pints [4.3 l] water
3 lb [1.4 kg] white resin
3 pints [1.7 l] raw linseed oil

Method

The recipe was divided by 30, which seems a large figure but still produced over 9 oz [255 g] of material. The recipe was therefore reduced to $1^{3}/_{5}$ oz [45 g] of rosin, 5 fl oz [142 ml] of water, $3\ ^{7}/_{10}$ oz [105 g] of glue and 2 fl oz [57 ml] of oil.

Changes made to this recipe were the substitution of a yellow rosin for white resin. Whether this change has a more significant effect on the working properties of the final material other than merely the colour is a matter for further investigation. Secondly, the amount of water with which to soak the glue was specified and this proved only just adequate for swelling the pearls. This was finally melted in a double boiler. The rosin was dissolved in the oil in the usual way forming a clear slightly viscous liquid. The hot oil/rosin was then added to the warm liquid glue and heating was continued for a further 30 minutes as instructed by the recipe.

Observations and working properties

The oil/rosin/glue did appear to emulsify, although not as readily as the glue/oil in the 1823 recipe. There seemed to be a thin film of the oil mixture on the surface that would not amalgamate. This was confirmed when a portion of this "liquor" was allowed to cool and there was a clear oily film, which would not gel, on the surface of the opaque, golden coloured gel.

Again, handling difficulties were experienced at the point where the dough was still very tacky but required very little further whiting or kneading to render it firm enough to be moulded. However, at this point, any handling or additional whiting (as in the 1823 recipe) had a tendency to make the dough too hard to mould in a very short space of time; under 2 minutes. Thus kneading was performed as soon and as rapidly as possible, forming a flat shape for the mould. This was difficult to achieve without incurring a wrinkled surface to the pressing and several attempts were made. The cast released easily from the mould and the final result had small wrinkles on its decorative surface and the back was covered in overlapping folds, however, it was generally smoother than the 1823 recipe. Again, it is felt that this procedure could be perfected with practice. Working with this recipe illustrated the degree and nature of the skill required to make compo. The folds would be eliminated to an extent under the pressure of a screw-press. Furthermore, although it had a flexible but very firm quality, this was not so pronounced as that of the 1823 recipe without rosin. The definition/detail was average and again, this is likely to be a result of pressing by hand. Finally, no colour change was noted when first pulled from the mould, but after 10 hours, this pressing was warmer in colour than the 1823 formulation.

1909 Ernest Spon, *Workshop Receipts' for Manufacturers and Scientific Amateurs*

1 lb [0.5 kg] glue ("in water sufficient to make a thin glue")
½ lb [0.2 kg] pale resin
½ pint [0.3 l] raw linseed oil

Method

The quantities indicated were reduced by a factor of 8 and were thus 2 oz [57 g] glue, 1 oz [28 g] rosin, 1 $^{1}/_{4}$ fl oz [36 ml] linseed oil. The oil, rosin and the glue/water were melted and mixed in the usual way, as instructed. The melted glue had been soaked with a little more water than usual to make "a thin glue" which was interpreted as a thinner glue than the consistency used in cabinet making, a consistency which has been referred to in other recipes.[2] This was added to the whiting as usual.

[2] See the first 1927 recipe of William Millar.

Observations and working properties

Again, the rosin was dissolved in the oil but the rosin/oil/glue mix did seem to combine quite readily in this recipe and formed a viscous, light golden coloured, opaque liquor. As kneading began, it was noticed that the texture of the dough seemed much softer than that of the previous two recipes. During kneading, it remained tacky for at least 2 minutes and was still quite soft and workable after 5. A couple of attempts were made at casting and it was found that the dough could be kneaded for more than 5 minutes without it becoming too gelled to press into the mould. The cast itself released relatively easily and the surface was covered with very fine faults. The back also had large folds and again, it seems that some practice is required to create a really smooth textured dough through kneading and a screw-press helps to provide crisper definition to the cast. However the definition here was reasonable compared to the previous two recipes. The colour was paler than the 1874 recipe and similar the earlier 1823 recipe without rosin.

1915 F. Scott-Mitchell, *Gilding, Bronzing and Lacquering and Glass Embossing*

12 lb [5.4 kg] of Best French Medal Glue
6 lb [2.7 g] resin
2 quarts [2.3 l] linseed oil (2 pints = 1 British quart)
1 ½ gallons [6.8 l] water (1 British gallon = 160 British fluid ounces)
Whiting

Method

The quantities provided in the recipe were divided by 55 as this created the most rounded proportions which were; 3 $^{1}/_{2}$ oz [99 g] of glue, 1 $^{3}/_{4}$ oz [50 g] rosin, 1 $^{1}/_{2}$ fl oz [43 ml] linseed oil and 4 $^{2}/_{5}$ fl oz [125 ml] water.

Observations and working properties

The amount of water specified was sufficient to swell the glue pearls and make a glue the consistency of that used for cabinet making. When the rosin/oil was added to the glue, the resulting emulsion was the characteristic pale yellow/gold; this recipe

created a less viscous resin/oil liquid than the 1909 recipe. The dough was relatively soft and pliable and it was possible to knead it for a couple of minutes before it began to gel. The cast itself was not wrinkle free, and there were many fine lines, though once again additional pressure would improve definition. The texture of the cast after one hour still retained a moderately flexible but firm quality and the small voids were observed in cross section. The colour was very similar to the 1874 recipe and the Millar recipes discussed below.

1927 William Millar, *Plastering-Plain and Decorative*

Composition for Picture and Mirror Frames (prepared without pitch)

7 lb [3.2 kg] best scotch glue dissolved in 2 ½ [1.4 l] pints water
5 gills [0.7 l] linseed oil (1 British gill = 5 British fluid ounces)
3 ½ lb [1.6 kg] resin
¼ lb [0.1 kg] pitch
Enough sifted whiting to make a stiff but pliable dough

Method

This recipe again was for a large quantity of compo so quantities were divided by 30 to give the following proportions of the core materials (in addition to sugar); 3 $^{7}/_{10}$ oz [105 g] glue dissolved in 1 $^{3}/_{5}$ fl oz [46 ml] water, $^{4}/_{5}$ fl oz [23 ml] oil, 1 $^{9}/_{10}$ oz [54 g] of resin and $^{7}/_{10}$ oz [20 g] of sugar dissolved in water. The original Millar recipe also included pitch. In order to assess the effects of this ingredient, it was decided to make two samples, one with and one without this ingredient. These paragraphs describe the observations for the material prepared without pitch. The experiment with pitch included is described below.

The wet ingredients were dissolved in the usual way; dissolving the sugar in a little water separately before adding it to the glue solution, then adding the rosin/oil (and returning the whole mixture to the heat to ensure it was as warm as possible before adding to the whiting).

Observations and working properties

This recipe did not call for very much oil in proportion to the rosin and consequently, the rosin took a little longer to dissolve; approximately 45 minutes. Furthermore, the glue, soaked in the small quantity of water specified, would have been so thick as to be very difficult to thoroughly dissolve were it not for the addition of the sugar solution which made it slightly thinner. Therefore the resulting glue/oil/rosin emulsion was extremely viscous. The colour of the wet ingredients when amalgamated was paler than previous recipes and these ingredients did seem to combine readily without producing an oily film on the surface after resting for a couple of minutes.

When adding the whiting, it was again found that the working time, though not as long as that of the 1909 recipe, was a little longer than the recipes from 1823 and 1874. The material was quite soft when first kneaded and began to harden past the point of casting after about 4 minutes in a warm room. The cast itself released easily and the texture was smoother than previous recipes. Some fine wrinkles did still appear on the decorative surface despite every effort to ensure their elimination, but definition was reasonable. There were voids visible in the cast in cross section, approximately the same as for the 1874 recipe. Finally, the colour was the characteristic "biscuit" colour, and very similar to the 1874 recipe.

1927 William Millar, *Plastering-Pain and Decorative*

Composition for Picture and Mirror Frames (prepared with pitch)

Method

This time the 1927 recipe was made with the pitch specified. The pitch used was Venetian turpentine ($^{1}/_{10}$ fl oz [3 ml]). In all other respects, the conditions of the previous test applied.

Observations and working properties

The colour of the "juice" was once again the characteristic pale yellow gold and the viscosity of thick syrup. Having been added to the whiting, the dough was noticeably soft, pliable and therefore easier to knead than the recipe made without pitch. Casting was again easy and the resulting texture was quite smooth with a few blemishes and wrinkles thought to be due to lack of pressure in casting and slight imperfections in the mould. There were the characteristic voids in cross section when trimmed and the cast still retained a fairly flexible but firm quality after it had gelled for about 1 hour. The colour was very similar to the previous Millar recipe.

1927 William Millar, *Plastering-Pain and Decorative*

(London Composition, said to be an old recipe used in most London shops)

16 lb [7.3 kg] town glue dissolved in 5 pints [2.8 l] water
9 lb [4.1 kg] resin
3 ½ pints [2 l] linseed oil
Enough sifted whiting for the consistency of thin dough

Method

The recipe quantities were divided by 100. The proportions were thus $2\ ^{3}/_{5}$ oz [74 g] glue to 1 fl oz [28 ml] water, $1\ ^{2}/_{5}$ oz [40 g] resin, $^{7}/_{10}$ fl oz [20 ml] linseed oil and $^{1}/_{2}$ oz [14 g] sugar dissolved in about $^{1}/_{2}$ fl oz [14 ml] water. Again, the amount of water specified in the recipe was rather inadequate to even partially swell the glue pearls and the sugar solution was used to assist when melting it. The oil/resin was added to the glue/sugar solution producing a pale gold coloured emulsion of thick syrup consistency. Whiting was added in the usual way.

Observations and working properties

When enough whiting had been incorporated to form a dough, its texture was again quite soft with a relatively long working time. It was too tough to mould after five minutes, however it was easier to knead than the 1823 and 1874 recipes and it was possible to achieve a smooth disk to push into the mould. The cast released easily and

did have reasonable detail with a generally smooth and wrinkle free decorative surface.

Again, the texture of the cast was firm but still slightly flexible. This quality was still perceptible after about 2 to 3 hours although after 10, the cast was too dry to detect it. Again, the colour was very similar to Millar's picture frame and mirror composition.

In all the recipes, the cast had obviously gelled enough in the brief few seconds that it was pressed in the mould for it to be removed from the mould immediately and for the excess to be trimmed easily and cleanly with a knife. It was noted that trimming was extremely difficult after 2 hours because the cast was too tough.

Discussion/Summary

A number of general points can be made from testing the formulae of the historic recipes. First, it was possible to produce reasonable casts in most cases. This was possible even without the level of skill that can be gained through working in the trade, though many of the fine lines would have been eliminated with a screw-press. The Millar recipe that included pitch (Venice turpentine) was felt to have the best working properties and to produce the best results. The patent recipe of Westwood also proved to have excellent working properties and cast well, though the fine fibres from the threads contributed to a slightly rougher surface texture. The Westwood cast was also considerably lighter. The inclusion of the flour paste reduced the need for very much whiting, and thus the weight was reduced. The 1688 recipe of Stalker and Parker, the Nicolson recipe of 1823, and that of Savory, were probably the least successful in terms of working properties and results. As the recipe of Savory was the only four-ingredient formula to perform at the bottom end of the scale, the four-ingredient formulae generally produced better results, but again, the inclusion of a plasticiser like Venice turpentine considerably improved the recipe (**Fig. 140**).

Nevertheless, substantial reductions in the quantities, even to the point of omitting one ingredient completely can still produce a material from which a reasonable cast can usually be made. This indicates a significant margin for error is possible in making serviceable compo in a workshop situation. Assuming that makers of compo have

always exploited this margin for error, this suggests that the relative quantities of the ingredients used in historic samples of compo may vary considerably even where the same recipe has supposedly been employed. This underlines the potential difficulties likely to be encountered in any scientific project which attempted to link quantitative analytical information and provenance.

From the sources of recipes such as the practical manual of Nicholson, it is difficult to determine whether the four ingredient recipe associated with compo today, was or was not in widespread use by the early 1820s. The Nicholson recipe does not include rosin, suggesting the latter. However, it does actually work, producing a flexible casting material, although not of the optimum quality in terms of working and finished characteristics. On the other hand, the Birmingham patent recipe of Obadiah Westwood presents compelling evidence that four-ingredient technology was known even outside London by 1786. Further visual evidence from both frames and architectural mouldings that the four-ingredient material was known in the provinces during the 1790s strengthens the idea that a firm used such a formula some years earlier in London. However, the visual evidence provided by certain picture frames from the 1810s and 1820s, suggests that the four-ingredient compo was not always used and therefore perhaps not universally known.[3] This may indicate the level of secrecy within the trade surrounding recipes at this date and argues for the relative novelty of the formula in the 1810s. Although the Nicholson recipe is not of the four-ingredient variety its publication within a practical manual suggests a certain lifting of secrecy around the formulation of materials such as composition by 1823.

In order to further develop a practical understanding of the working and drying properties of compo, further experiments were conducted in which the proportions of the key ingredients were substantially varied. The basic recipe chosen for these experiments was the Savory recipe of 1874 because the quantity of water in which to soak the glue was specified, eliminating at least one possible variable.

The graph in **Fig. 141** describes the effect of varying the ingredients of the 1874 formula, on three physical properties: malleability, fissures or cracking and voids.

[3] See the notes to observations at the end of this chapter.

These are subjective values, from 1-5 where 5 represent the greatest degree of malleability, cracks or voids according to observation. Although strictly subjective, it is felt that the differences in the physical properties of the compo resulting from such large variations in the original formula were great enough to quantify the results in this way.

Although the primary purpose of the tests was to improve understanding of the contribution of each ingredient to the working properties of compo, they *may* provide some help in understanding historic samples where these exhibit particular physical features such as cracking and voids which were seen in the test samples. As historic samples will have been subject to deterioration over a long period, any link drawn between original formulation and visible defects in a historic sample would have to be extremely tentative.

Nevertheless, the immediate results of varying individual ingredients are quite distinctive. For example, as might be anticipated, halving one ingredient has the effect of making the others more dominant. However, within this broad statement there are interesting nuances. For example, when the quantity of rosin was halved in the 1874 recipe, the ill effects on the handling qualities related to the excess of oil were very pronounced. The cast sheared away in strata where it had not melded during kneading and was extremely greasy and crumbly. However, the same effects were not observed when, for example the quantity of oil was doubled. The actual difference in these two tests is made clear by the graph which shows that malleability was far better with the oil doubled. In that test, there was far more oil relative to the other ingredients than when the rosin was halved. This appears to indicate that the oil has a considerable influence on the malleability of the compo and up to a point can improve it. However, too much oil is clearly a major factor in the production of fissures and cracking as both the test which doubled the oil and that where the rosin was halved show. However the incorporation of whiting was noted to be greatest in the test that doubled the oil content, and that which halved the oil, the least; exactly half the quantity of whiting.

As the test increasing the whiting shows a marked reduction in malleability and a worsening of cracks, it may not be merely a high oil content that contributes to

cracking. This is interesting because it is sometimes advised to incorporate as much whiting as possible to improve handling qualities and the resulting cast.[4] Whether the cast is improved in the longer term can only be determined with further analysis. As the glue is the dominant ingredient in terms of quantity (in the correct formula), and has been shown to contribute to the appearance of air pockets and improved malleability, it is not surprising to note these features on the graph for the test with reduced whiting, which allows the effects of the wet ingredients to take supremacy.

Those tests where the glue component was dominant also showed substantially improved malleability. For example when the glue content was doubled and where the oil was halved. Again, from the graph, the latter test seems to offer confirmation that the oil content is responsible for cracking as the cracking is significantly reduced. However, these two glue rich tests also indicate that too much glue can contribute to an overabundance of voids or air pockets. This is countered to an extent by ensuring that the glue is not over-heated, as with the preparation of good gesso, but as care was taken during each procedure, it is perhaps difficult to escape in the making of compo. Nevertheless, tests indicate that the presence of many voids in a sample is the result of an excess of glue in the recipe.

The indication that glue contributes to improved malleability is further confirmed by the test that halves the glue content (**Fig. 142**). Here the oil and rosin content dominate, resulting in cracking. It is interesting to compare this test on the graph to that which doubles the rosin. In this instance, the results are very similar though the cracking is not quite so pronounced. As the graph shows, however, when the rosin is halved, the cracks worsen but the malleability improves, indicating that rosin does not contribute to malleability but may have some effect on handling qualities in that it helped to reduce cracking. The extent to which rosin may contribute to the improved strength of a recipe is a subject for scientific analysis.

As regards shrinkage due to loss of water, results ranged from between 2 mm (the 1909 Spon recipe) to 5 mm (the 1823 Nicholson recipe). These final results were recorded a number of weeks after the casts had been first made but it was noted that

[4] Personal communication, Christine Powell, Senior Gilding Conservator, Victoria & Albert Museum.

most of the dimension loss occurred within the first 72 hours as a result of the loss of water. No particular connection could be drawn between shrinkage and the relative proportions of the ingredients.

The success of these tests suggests that historically, experienced compo makers may not even have weighed ingredients, in a similar way to recipes in cookery. In a similar way, the compo recipes were probably handed down from one craftsman to another. The complete omission of a minor ingredient is also possible and may have been subject to availability. Therefore its absence from a formula would not necessarily indicate a different maker's recipe. A compo maker of any experience would probably not make a serious mistake in the relative proportions of the ingredients, (indicated by those tests that vary the proportions here). Such mistakes were therefore probably quite rare. Again, a more slight alteration in the ratio of ingredients might have a more pronounced effect over time.

If it was relatively easy to create a satisfactory compo, then the correct recipe cannot have been such a rare and prized commodity as the trade secrecy surrounding the trade might suggest. This indicates that such secrecy was used as a marketing tool that was dropped when the initial popularity enjoyed by the new material had died away. This is supported by archive material within the main body of this thesis.

Notes on an Observational Survey of Composition Ornament (Appendix VI)

A selection of objects from several collections, decorated with cast enrichments were the subject of close inspection with the naked eye. This main purpose of this survey was to determine whether visual differences denote a marked change in the type of casting material used over time. Therefore, whether evidence supports that suggested within the main text, of an initial period of experimentation followed by the general establishment and use of the four-ingredient formula.

The combination of materials may be significant, for example, whether a particular type of material is noted in conjunction with carved elements in objects that can be dated to the late eighteenth or early nineteenth century. A marked difference in the type of material used for different parts of one frame could indicate the use of different manufacturers' formulations as revealed by evidence from Chapter Three.

However, it has been said that different formulas could also be used on one frame within the same workshop.[5] Therefore any conclusions to be drawn from such evidence can only be tentatively drawn.

The colour and texture of the material was noted (where possible). Although the term "biscuit" is used to describe the appearance of material that looks like the four-ingredient compo, the use of this term refers to a specific reference (range of colours within a hue) in a colour chart defined in the glossary. The material was often obscured by varying amounts of dirt and in some cases, the colour of any given sample varied considerably in itself. Moreover, the position of the break from where the colour of the material was observed was often poorly lit, making it impossible to compare the colour to a chart with any degree of accuracy. However, it is felt that that the simple observations and descriptions are at least consistent because they have been undertaken by the same individual. It is also felt that the detail they contain provides sufficient information to help draw some conclusions within this thesis and may prove useful to further research.

Other factors, such as evidence of alterations to the construction of the object, have been noted where they may be of some relevance, for example to the date of the moulding material itself. The condition of specific areas on the surface of the objects has been noted. This is because the character of the cracking and breaks, for example, often provides a useful guide to the type of material employed, the ways in which it has been used and the underlying structure of the object. The finish has been noted in many instances. However as the latter is a field of study unto itself, it has been observed only as a reference point, often to determine if mouldings are replacements where other forms of evidence have failed and where the finish can supply the answer.

Although the style and pattern of the object provide yet another crucial layer of information that can be used to inform observations and thus sharpen the focus, it is not the intention of this survey to provide a detailed description of the style of every

[5] Communication with Hubert Baija, Department of Frame Conservation, Rijksmuseum, Amserdam. It is said that different materials were used according to the susceptibility to damage of each design element on a frame. However no contemporary or historical evidence has been found for this practice in this country by the author.

object. Patterns and styles are referred to where necessary to identify the part of the frame in question.

The objects were chosen to encompass the possible initial period of experimentation through to the establishment of a standard four-ingredient formula. The collections surveyed were also chosen because they included a selection of the more representative frame types in addition to more unusual examples, across a broad time span, the earliest probably dating from the 1790s. No examples have been found which are confirmed to predate this. Selection has also been guided by the condition of the frame; it was important to find examples that were in both good and bad, original or restored condition, to illustrate the ways in which the moulding material was applied and how it can behave over time. Early (late eighteenth and early nineteenth century) examples such as those at Tate Britain and the Dulwich Picture Gallery were chosen because, in terms of the ways in which they were produced and the materials used, they appeared to exhibit the most unusual features. The time constraints of the project and object access have been a factor in restricting the examples for consideration. Finally, the examples under consideration are picture frames. This is partly because few architectural examples that can be successfully dated seem to have survived. The development of the use of compo is also so closely allied to its use on picture frames that it is felt a survey of frames is still representative of developments.

Summary

Primarily, the survey reveals the complexity of individual objects. It does indicate that in certain cases, such as the Stubbs and Gainsborough examples, the use of different moulding materials on one object. Unfortunately there is no other form of evidence to indicate whether this represents different formulae applied over a period of time, whether they are the formulae of different makers, or indeed the different formulae of the same maker. In addition, those examples which appeared to be a material very different from the characteristic four-ingredient compo, did not correspond to the more unusual recipes tested. For example, the material on the Dulwich Picture Gallery examples was a little too coarse and chalky, when compared to the 1823 Nicolson recipe. Furthermore, the materials are often obscured with many finish coatings (from different periods). It is to be remembered that even if an

original finish can be identified, it is most likely that it does not represent the work of the manufacturer responsible for the ornament, established in Chapter Three of this thesis. These factors highlight the need for further strands of information to resolve some of these questions, hence their usefulness within the body of this thesis.

On balance, this survey does suggest the possibility that very different formulations from the four-ingredient compo were being used for cast decoration on frames in the early nineteenth century. This is noted particularly in examples from the Dulwich Picture Gallery, though the date at which the moulding material was applied to these frames remains in question. On balance, and coupled with the appearance of material of a similar character on other frames such as the "Stubbs", (the back edge ornament) it is thought to be early, though the possibility that some of the sections are a much later restoration cannot entirely be ruled out. It is also possible that these examples represent work outside the frame-making trade.

The possibility that the four-ingredient compo was used on frames in the late eighteenth century is also suggested by the Stubbs example. The Turner examples (from the Victoria & Albert Museum) indicate that the four-ingredient formula was used, at least in certain instances, during the 1810s. Clearly, other examples from the Victoria & Albert Museum indicate that both a standard formulation and production method had been well established by the 1830s and '40s.

Finally, although the focus of this thesis is strictly British, it is worth noting the marked difference in the fine, chalky white moulding materials seen in continental examples such as the frame to "La Baigneuse" (n.d.). The date of this frame and the apparent prevalence of this type of material, particularly on French frames, suggest that the four-ingredient formula did not enjoy the continued period of use that it did in Britain. Furthermore, the evidence of this frame suggests that the material is linked to different production methods.

Appendix VI: Observational Survey of Composition Ornament

The Victoria & Albert Museum

1. Detail of frame to *Sketch for The Letter of Introduction,* 1813, Sir David Wilkie, (Museum no. F.A.227), Sheepshanks Gift (**Fig. 145**)
   Frame, second half of the nineteenth century.

   This example is heavily restored/over-gilt, noted particularly in areas of toning that now appear as dark patches. Areas of compo ornament are becoming detached from the cross-hatched scotia section, and there are considerable losses and cracking to the top edge of simulated bamboo ornament. The compo is a smooth "biscuit" colour, although it is obscured by dirt in most places.

2. Detail of frame to *The Fight Interrupted*, signed and dated 1816, William Mulready, (Museum no. F.A.139), Sheepshanks Gift (**Fig. 146**)
   Frame, second half of the nineteenth century.

   The surface of this frame is a good example of the way in which pollution can affect gilding. The compo is in relatively good condition apart from the outer edges of the corners, although very fine cracks cover isolated areas. The ornaments are comparatively crisp as they have not been re-gilded. However, the surface is so blackened that it is impossible to determine the colour of the compo.

3. Detail of frame to *East Cowes Castle, Isle of Wight*, exhibited at the RA 1828, J. M. W. Turner, (Museum no. F.A.210), Sheepshanks Gift (**Fig. 147**)
   This style of frame was popular in the 1810s but continued to be made into the 1820s. It may be original to the painting.

   The original gilding to this frame may not be entirely intact, but in many areas there is only one layer of gilding. The compo is crazed with very fine cracks in most areas but these cracks generally do not go through the entire thickness of the elements. However there are some very large cracks and losses, and in a number of areas, the gilding is peeling and de-laminating. The corner shells appear to

have been contrived to accommodate the glazing window, suggesting that these elements were added when the painting was subsequently glazed.

The gold leaf to the main scotia decoration is a different colour to that of the corner and rail decoration. Both areas are crazed in a similar way but there is little real damage to the scotia ornament making it impossible to compare the colour of the compo to that of the corners. However damage to the other elements in a more vulnerable position on the outer edge, show the usual "biscuit" colour to breaks that have not been coated with dirt.

4. Detail of frame to *Life Boat with Mamby Apparatus, like East Cowes Castle*, painted for the architect John Nash, or perhaps bought at the RA where it was exhibited in 1831 [100, p. 285], J. M. W. Turner, (Museum no. F.A.211), Sheepshanks Gift (**Fig. 148**).
   Like no. 3, this frame is of the same period; 1810s –20s. It may therefore be original to this painting (though there is a chance that it was used for another work before this painting was executed).

   This frame has been heavily re-gilded. The scotia decoration is the same, as the above example but the corners are different, again suggesting that these were two identical frames that were altered at some stage, possibly when they were glazed as suggested. It is possible that the frames were not original to these paintings and the enrichments were added when they came to be used for them. The back edge decoration is identical, supporting the possibility that they were originally identical.

   The "additional" elements to this frame are far less crazed than those of its "pair", however the scotia ornament has a similar crazing pattern despite the re-gilding. The "additional" elements to both examples have been coated with a thin layer of gesso, whereas the scotia elements are oil gilded straight onto the compo.

5. Detail of frame to *The cow-yard*, signed and dated 1831, John Linnell. (Museum no. F.A.134), Sheepshanks Gift (**Fig. 149**).

Frame, second half of the nineteenth century, and thought to be the gallery style as opposed to the style of the patron.

Typically, there are fairly significant cracks about every 3 to 4 inches. The top edge is a solid convex compo band. The crossed ribbons in a slightly greyish "biscuit" coloured compo, laid over the top of the leaf pattern to the centres and corners, have a thin coating of gesso and an Armenian coloured bole. These areas have been burnished while the rest is an oil/matt finish. They look consistent and have the wear of some age (there are some losses). However, dark areas over the cracks indicate past efforts to disguise them with "gold" paint, which has subsequently discoloured.

6. Details of frame to *Saint Cecilia and the Angels*, signed & dated 1836, Paul Delaroche, (Museum no. 553-1903), **Fig. 150**.
   Frame, second half of the nineteenth century.

   This example shows applied compo ornament to a large frame. The ornament is produced in fine thin strips and applied over the convex and concave mouldings in the usual manner. The gesso is visible under more recent losses to the geometric back edge mouldings.

   Many fine cracks and losses cover all areas of applied ornament. A variety of different bole colours have been used, and there are areas of burnishing to the raised flat moulding between the scotia and sight edge. For example, yellow bole is present where there is oil gilding. However there is much evidence of restoration and the use of "gold" paint. The picture frame surrounding *Portrait of John Sheepshanks*, dated to 1832 [100, p. 208], William Mulready (Museum no. F.A.152), Sheepshanks Gift, is a further good example of the extent to which over-gilding can obscure the detail of surface decoration (**Fig. 151**). This frame may be as early as the painting but this has not been proved.

7. Detail of frame to *Autolycus*, C. R. Leslie, exhibited at the RA in 1836 and commissioned by John Sheepshanks (Museum no. F.A.115), Sheepshanks Gift (**Fig. 152**).
This frame may be original to the painting. Its distinctive style is similar to a number of others surrounding works from the same patron. The style is certainly in keeping with the mid to late 1830s.

Again, the swept back-edge has a layer of gesso showing that the frame was coated with it before the compo was applied. This is evident on many examples and it was the conventional sequence for producing compo frames. Although there is no sign of gesso on the compo enrichments, all areas (even those devoid of applied ornament) reveal the same dirty cream colour through the worn areas of gilding. It appears that a thin wash of colour (in addition to the gilding mordant) has been applied to the compo before gilding. The gilding on this frame is in extremely poor condition. Most areas are oil gilded except for the top edge rails (part of the wooden profile), which show evidence of water gilding. This indicates how the use of compo on a wood structure influenced the way the object was finished; the gesso coated wooden rails could be burnished, but the compo would require gesso and bole, adding time to manufacture, therefore they were simply oil gilded. The cross-hatched pattern in the gesso seems to be executed by hand with a carving flute or similar tool. This is surprising, given the relative economy of production, but no "overlap" mark of a stamp-like tool is visible.

The major cracks run through the ornament covering the mitres and the finer cracks are to the fine scrolls and random areas of thinner ornament. There is a greater degree of damage to the extremities of the more vulnerable cartouches. The breaks in the compo again reveal a pale, smooth "biscuit" colour. There are fine, isolated cracks to applied elements such as the corners, indicating the construction of the frame. These elements are bold and distinctive and each can be separated into the size suitable for individual wooden moulds. This is confirmed by the back-edge moulding, where the joins of approximately 12 inches are clearly visible. The corner and centre elements have been cut away to accommodate the later glazing. The sight edge, under the glass, may therefore be new when the glazing was inserted. (The same distinct joins with approximately

12 inches between them can be seen on the frame to *Beating for Recruits*, n.d., Thomas Webster, Museum no. 536-1882, Jones Bequest 1882, **Fig. 153**, which exhibits the typical Jones pattern.[1] This painting was probably framed by the patron, possibly in the 1860s).

8. Detail of frame to *Florizel and Perdita*, exhibited at the RA in 1837, C. R. Leslie, and said to have been painted for John Sheepshanks, (Museum no. F.A.114), Sheepshanks Gift (**Fig. 154**).
   Frame identical to that of no. 7.

   This frame is in very similar condition to the previous example. A distinct thin coating of dirty cream colour has been applied even over the compo elements. The areas of burnish on the rails show evidence of a lead coloured or "black" bole beneath the gilding.

9. Two noteworthy frames from a technical point of view are *Returning from the Fair*, signed & dated 1837, Thomas Webster, (Museum no. F.A.221), Sheepshanks Gift (**Fig. 155**) and the identical *Going to the Fair* of the same year (Museum no. F.A.220).
   This broad, cushion frame covered with fine leaves is again typical of the late 1820s and 1830s. It may therefore be original to the painting. The same pattern is also noted on a number of other works from the same patron.

   These show the "lace" technique for giving texture to a background. Again, losses show that the gesso has been applied to the entire profile, then the net has been applied, and finally the compo designs.

   This frame has been re-gilded more than once and there are quite a number of losses and badly damaged corners that are heavily restored. The compo itself has the characteristic smooth texture and "biscuit" colour. The corners seem to have been disturbed, again as a result of later glazing.

[1] According to background research, this may indicate that the frame-makers were J. & W. Vokins.

10. Detail of picture frame to *The Governess*, signed and dated 1844 and exhibited at the RA in 1845, Richard Redgrave, (Museum no. F.A.168), Sheepshanks Gift (**Fig. 43**).
It is possible that this frame is original to the painting, though the very fine strips of pattern are more commonly found on frames from the 1850s and `60s.

The outer scotia ornament has very defined "joins" which are less than 12 inches apart indicating that the ornament was produced from a wooden mould. It is certainly very crisply moulded. There are fine hairline cracks, although this object is in relatively good condition.

11. Detail of frame to *Sancho Panza*, 1850, William Powell Frith, (Museum no. 480), **Fig. 156.**
This frame does not exhibit the typical "Jones" pattern and may therefore be a replacement, though the style is correct for 1850.

This is a good example of pierced compo work, and illustrates the suitability to such a task of a material that will maintain its shape while remaining flexible.

12. Detail of frame to *The Bagpiper*, signed & dated 1847, Frederick Goodall. (Museum no. 530-1882). Jones Bequest, 1882, **Fig. 157**.
This frame pattern (possibly 1860s) is typical of many within the bequest and may reflect Jones' taste, particularly as it appears around the work of more than one artist.

This example also bears evidence of "join" lines and yet the lengths of compo pressed into the scotia section are more than 12 inches long, and therefore longer than might be expected from an individual wooden mould. No joins were observed to the top edge. The quality of the frame is good, although it has suffered many losses revealing the gesso underneath. A number of these areas have been coloured out with "gold" paint. Other losses have occurred to the beading on the outer edge and there are several significant cracks to the top edge and many hairline cracks to the thinner areas in the scotia moulding. The compo is a dirty "biscuit" colour and the entire object appears to be oil gilded.

13. Detail of frame to *An Anxious Hour*, signed and dated 1865, Alexander Farmer, (Museum no. 541-1905), **Fig. 158**.
The frame style is very typical of the 1860s and is probably original to the painting.

This frame (of small geometric pattern repeat and top-edge pattern in "bamboo") shows evidence of "join" lines in the main strips of pattern. The composition is the usual "biscuit" colour.

14. Details of frame to *La Baigneuse*, n. d., Narcisse Virgile diaz de las Pena, C. A. I 61, Ionides (**Fig. 159**).
The frame is typical of French examples from the last third of the nineteenth century. It is not known if it is original to the painting.

This French frame is worthy of examination for comparison with British examples of similar period. The individual design elements are extremely similar to each other, down to the number of veins on a leaf, which indicates that the flutes were obtained from a mould.

From a small area of relatively recent damage, the moulding material looks much coarser and more variable in colour than the traditional smooth "biscuit" compo of British frames. It is an off white to a pale grey/brown (although this could be where the break has begun to discolour on exposure to the elements). There are pin-sized holes that resemble air pockets in the plaster-like texture and these are visible on the gilded surface. Significantly, the few cracks travel through both areas of high relief and the low "background" areas, suggesting that all the design elements have been cast as one thick moulded length (one strip per side). This is further supported by the fact that no "join" mark can be identified, despite the fact that the pattern is repeated more than once. Indeed, a break at one of the mitres confirms this. The ornament exhibits considerable undercuts, suggesting a flexible mould.

The swept back edge has a polished appearance, although it does not seem to be highly burnished. This example also appears more heavily gilded than its British counterparts. Finally, the bole is of a dark brick red colour.

15. Detail of frame to *Florence Dombey*, signed & dated 1888, W. Maw Egley (Museum no. 1824-1900), Ashbee Bequest, **Fig. 160**.
Frame, probably original to the painting.

The production of this frame seems to have been machine assisted, with the raised ornament and background texture in shallow relief pressed out as one strip. This is suggested by the even crazing which goes right through all areas of the ornament. There is no gesso to this area and the finish here is a bronze powder. In addition there are no visible "join" lines, and the general poor quality of this example suggests mass production. The simple acanthus corner decorations are almost certainly applied by hand. All the wooden mouldings have first been coated with gesso, and the bands of compo subsequently applied in the conventional manner. The compo bands are not pierced and are of a pale "biscuit" colour.

There are a number of obvious, though minor repairs. However, there are few actual losses (the corners have suffered the most). Most of the breaks have been coloured with "gold" paint or cream, and their relative age means that they are coated with dirt, obscuring the colour of the compo. The texture of the compo used here has the familiar smooth, hard, brittle quality.

Dulwich Picture Gallery

16. Detail of frame to *The Fall of the Rebel Angel,* Sebastiano Ricci (1659-1734), no. 134, Bourgeois bequest, 1811 (**Fig. 161**).
The style of this frame, with deep scotia and reeded top edge is in keeping with the 1800s, 1810s and occasionally the 1820s.

The majority of the corner elements, including the shells and flat incised area are carved. The small inner leaves are cast in a moulding material. There are very

few breaks or cracks to the corners and they are appear to be through the surface coatings only. One of the inner leaves has a small break on the underside, revealing a very white material. However it is neither exceptionally smooth like traditional compo nor extremely coarse.

The scotia decoration is very thickly and roughly cast, and the back edge moulding is of similar variable quality. There are no losses, but many wavy, poor areas may indicate surface build up and/or heavy restoration. The scotia moulding (and possibly other elements) is to be made of a coarse white moulding material. In certain areas around the bottom edge, the material used has the colour and finer texture of gesso putty.

The finish has been over-gilded more than once and "gold" paint or powders have been used.

17. Detail of frame to *The Resurrection*, painted *c.* 1712-1716, Bourgeois Bequest, Sebastiano Ricci no. 195, 1811, (**Fig. 162**).

The basic structure of this frame is more in keeping with the mid eighteenth century. For example, the beautifully carved gadrooning to the top edge that curves right over a deep scotia. The sight edge mouldings consist of a carved band of bead and of leaf, edged on the other side of a plain frieze with a band of carved rope.

The corners are later additions, although employing the same basic carved leaf pattern as the previous example. Therefore this frame may be an early nineteenth century adaptation of a mid eighteenth century frame to match no.16. The point at which the new corner blocks meet the old frame scotia can be seen from the "dip" in the curve of the scotia, and the "join" lines are clearly visible through the frieze on all four corners. Like the previous example, many small moulded leaves have been applied inside the larger carved leaves. Although very similar, the main leaves on these corners are more elongated and less bulky than the previous example.

Finally, the band of ribbon and stick on the back edge have been crudely cast from the same coarse white material, and attached on a strip of wood, clearly after the corners have been added.

18. Detail of frame to *Christ and the Woman taken in Adultery*, Giovanni Francesco Barbieri called "Guercino", no. 282, Bourgeois Bequest, 1811 (**Fig. 163**).
The reeded top edge of this frame and the heavy foliate corners are again consistent with a date in the 1810s or 1820s, although the corners have been badly set in. This suggests that, though of the 1810s, the frame may have been altered at that time to accommodate this painting and the corners also applied at that time.

This third frame of similar style exhibits further variations. The corners consist of a wooden block set into the main frame section. Again, the cast elements on these corners are badly moulded in a coarse white material, similar or identical to that found on the previous two frames. It is difficult to tell if the cast ornament on this example has been moulded using one of the other frames as the model, because the ornamentation here is so distorted. The curvature of the inner leaves on the corners suggests a flexible material.

There are many fine cracks to the outer scotia and deeper cracks to the prominent flats within the corners. It is not clear whether the acanthus leaves on the corners and the sight edge decoration are made of the same moulding material. There are no visible cracks in the corner shells, making it difficult to tell if they are also cast in a different material. However the bead and reel back edge moulding is made from the same coarse white material.

19. Detail of frame to *Landscape with Sportsmen and Game*, Adam Pynacker (1620-1673), no. 86, Bourgeois Bequest, 1811 (**Fig. 164**).
This frame may date from the 1810s or 1820s as the decorative frieze and heavy foliate corners are consistent with such a date.

Again, losses to the frieze ornament suggest that much (if not all) or the ornament is made of the coarse white casting material.

20. Detail of frame to *The Linley Sisters*, *c.* 1772, Thomas Gainsborough (1722-88), no. 320, Gift of W. Linley, 1831, (**Fig. 75**).
This frame is consistent with a 1770s date and therefore may be original to the painting. The large foliate corners have been added during the Regency.

Once again, on this example, there is a mixture of wood carving and moulding material.

The ribbon and stick sight and top edges are beautifully carved. It is difficult to determine whether the beading has been cast (it is thickly coated in many layers of "gilding") but it wavers slightly along its length suggesting a moulded band. When compared to its carved counterpart (**Fig. 73**), the individual beads have a slightly "squashed" appearance compared to the rather angular appearance of carved examples (due to the initial "roughing out" after which the angles are removed to create rows of half spheres). The back edge ornament is also moulded.

The large corner elements have cracked in the manner of traditional compo. For example, there are fairly wide gaps where cracks have gone right through and the material is the characteristically smooth, pale "biscuit" colour.

The fluted section is also moulded; again it is very clumsy, thick and distorted, which may suggest that it is a later addition, although such wide fluting is in keeping with a frame of the 1770s. As this section is coated in many layers of "gilding" and there are no obvious breaks or crazing, it is difficult to tell from observation only. The simple acanthus corners covering the mitre joins before the current enrichments were applied are clearly visible beneath. The frame may once have been completely plain but equally, the addition of such a minimal amount of ornamentation seems unlikely, suggesting that these leaves were original to the design. A deep crack in one leaf indicates that they are made from compo. When set against the intricately carved bands seen on the rest of the frame, this (together with the moulded beads) may suggest the initial, though minimal use of compo ornamentation in conjunction with carving.

Finally, the swept back edge is smooth right up to the mitres and shows no evidence of alteration to the main structure, though this is not conclusive proof that this frame is original to the painting.

21. Details of frame to *Portrait of a Man, 1663*, Pieter Nason (1612-1688/90), no. 556, Fairfax Murray Gift, 1911, **Fig. 165**.
This frame type is typical of French examples from the 1860s.

All the decoration on this French example consists of applied moulding material, which is again of whitish appearance and shows a slight texture but could not be described as coarse. It is finer than the coarse white material of the previous examples. It is obvious that the beading is moulded, for example, because it has an internal thread running through its length in the usual manner. It is also certain that the decoration on this frame is original and there are no later additions.

There are quite a number of losses and areas of old damage, with a few hairline cracks to some of finer areas. A "join" section is visible to the back edge ornament (bottom left) which spans approximately 8 to 9 inches. This is consistent with the "joins" to this moulding over the entire frame, and indicates the use of individual wooden moulds. The superior quality of the casts also suggests the use of such moulds.

The swept sides are very finely gilded and burnished; the bole colour is a brick red/orange, evident under a loss to the back edge decoration.

Tate Britain

22. Detail of frame to *Mares and Foals in a river Landscape, c.* 1763-8, George Stubbs (1724-1806), no. T00295, **Fig. 166**.
This frame is cited in *A History of European Picture Frames* as "probably original" for the painting [20, p. 66]. However the style with reeded sight edge could easily date to between *c.* 1780 and *c.* 1800. The evidence of this thesis definitely argues against a date as early as the 1760s.

The ornament on the frieze and sight edge looks like traditional compo. The carved reeds are bound with two ribbons of compo at intervals and these compo strips are coated with a layer of gesso where one might expect only the reeds to be coated. This may indicate re-gilding.

The ground (the flat frieze itself), scrolls and anthemia on the frieze seem to have been cast in a strip and the palmettes added later. The palmettes and the elements over the mitres have clearly been added after the other strip because they have many losses exclusive to these elements and detectable gaps around their edges. Furthermore, the fine cracks go straight through the elements that have been cast with the background frieze and continue through the frieze itself, again, suggesting they were cast as one. Although the compo ground section of the frieze on which these relief elements appear is fairly uneven, it is difficult to discern where there might be a "join" providing evidence of the use of individual wooden moulds.

The leaf and row of bead to the outer edge of the frieze have a different quality. Here, there is far less crazing, or actual losses to the extent that these areas appear to be made of a different type of moulding material and the few broken sections, such as the bottom right corner, show a coarser, plaster-like material. It is not the smooth compo used on the other areas and has a dirty grey colour. The bottom right corner also shows the same coarse material in an area where the mitre gap has been packed with a fillet of wood. It is not clear whether this indicates an adaptation of an earlier frame to take the moulded ornament or merely shows restoration after natural shrinkage.

The compo itself is very cracked, crazed and almost crumbling is some areas. It is generally darkish brown in colour, although those areas that are thought to be more recent breaks show the more familiar "biscuit" colour. The gilding on the frieze is peeling and curling around the edges of the pattern and de-lamination is occurring around the cracks to all areas of applied decoration. The back edges show the pegged mitres and the surface of these sides has a very worn appearance with evidence of a brownish yellow/green size coat. There is also evidence of

gesso and gilding to the sides. There is only one visible layer of gilding here, with little evidence of bole colours.

23. Frame to *Self Portrait*, *c.* 1799, J. M. W. Turner (1775-1851), no. NOO458, **Fig. 167**.
Although the frame may not be original to the painting, and is an unusual pattern for the date of the painting, it may be of a similar date.[2]

This frame exhibits unusual rococo style ornament at a date when one would perhaps not expect to find it. The top rail is gadrooned and the corner and centre cartouches all face one way and therefore all come from the same two moulds (one for the centres and one for the corners). The gadrooned top edges are taken from two "A" and "B" moulds and the extra ornamentation, of which there are three different patterns, also had their "B" moulds. The shape of all the ornaments has a soft, round edged character that usually characterises papier mâché. However the conservation notes indicate that the material used here is compo.[3]

The surface of the applied decoration lacks any major crazing and those cracks that do exist look relatively superficial, although this may be due to conservation and much intervention to the surface layers; the frame has been re-gilded relatively recently. The edges of the applied decoration have been incised around their edges to enhance the ornament's depth and impact.

24. The frame surrounding *Ophelia*, 1851-2, J. E. Millais (1829-96), no. NO1506, **Fig. 46**.
Frame possibly original to the painting.[4]

This frame was chosen because its applied compo ornament may have been produced with the aid of machinery.[5] The running pattern in the scotia, repeats approximately every 6 inches and has no evidence of "joins" where the one strip

[2] The frame is said not to be original to the painting: correspondence with Lynn Robert. The pattern and is a subject of further research.
[3] Frame Conservation Department records, Tate Britain.
[4] Personal communication, John Anderson, Frame Conservation, Tate Britain.
[5] Personal communication, John Anderson, Frame Conservation, Tate Britain.

of compo meets another. Similarly, the back edge moulding, which often provides evidence of this feature is equally precise in its continuity. The castings are extremely crisp and regular. No evidence could be found that the floral elements to the corners had been applied over the top of the long bands of ornament as one might expect. However, the beaded bands on the top edge were also probably pressed by machine like the scotia ornament and the floral elements applied afterwards.

Using the cracks in the compo for possible clues to this question of production, there appears to be little or no consistency. The familiar "biscuit" coloured compo is visible in the cracks. These cracks and breaks are far greater to the vulnerable top edge and corner decoration than to the scotia and back edge.

Yellow bole is visible on the top edge and scotia ornament.

Extended Glossary

Alum

Alum is a general term used to describe a range of inorganic earths which are composed of sulphate and aluminium ions together with a basic ion (such as K^+ or $NH4^+$) and water of crystallisation. These salts dissolve in water to form acidic solutions and indeed dissolve in their own water of crystallisation when heated gently.

Those said to be commercially available in the nineteenth century include potash alum ($AlK(SO_4)_2 . 22H_2O$ and ammonia alum $Al(NH_4)_2 SO_4 . 12H_2O$ [101]. Although available in several areas of Europe in natural form, the chief source in this country appears to have been a bituminous clay called "alum shale", from which the aluminium ores were extracted and combined with potassium or ammonium sulphate to obtain, after evaporation, crystals of alum.

Alum was used for a wide variety of purposes in the food, medicine, paper and leather industries and especially in the textile industry as a mordant for dyeing, (although how it works as a mordant remains unclear). However it does make animal proteins such as gelatine become hard and insoluble because (as the formulae show) it forms multiple hydrates and therefore its capacity to absorb water is considerable. It was this action which prompted its use as an occasional ingredient for use with **plaster of Paris**, **papier mâché** and forms of **carton pierre**, reducing the setting time and thus working times, something that was particularly useful for external work.

Bulk Gold

According to Grimm, this material was employed in a similar way to compo but differed from the four-ingredient recipe in that it lacked linseed oil. However, descriptions of its ingredients and use are often ambiguous [23, p. 7]. It seems that like **stucco**, it was widely used in the Italian Baroque period and in Britain in the eighteenth century and nineteenth century Baroque revival patterns. Grimm mentions that "ornamentation was created from bulk gold as well as from gypsum in so-called 'gypsum foundries', and then glued onto the wood frames" [23, p. 7]. However, whether bulk gold was made with gypsum, glue and rosin in Britain is still unclear. It may be that it was a generic term for cast and applied ornament in relief and did not refer to a material of specific ingredients.

Burgundy pitch

Again, this is an occasional ingredient of composition recipes and was added as a plasticiser.[1] A systematic material study would be required to assess how effective it actually was in countering brittleness, shrinkage and cracking. However, tests indicate that this ingredient is particularly important for the gelation stage of compo when a good recipe will improve malleability, allowing enough time to work the ingredients to a smooth dough that can be applied with ease to a mould to create a good quality cast. Its components will not polymerise, thus it is not likely to change into a polymer network like that found in a film of drying oil. However, as it contains a number of volatile components that evaporate rapidly when a film is laid down, too much in a compo recipe may be the cause of shrinkage and cracking.

Burgundy turpentine is the French source of turpentine and rosin that sometimes appears in historic recipes. It is obtained from the tree *Pinus maritimus*. Burgundy pitch was a term used to describe a grade of Burgundy turpentine that is only slightly solidified and purified.[2] "It is called for in some antiquated recipes, principally in medicine; it has no value in painting mediums and few properties for technical uses that cannot be duplicated by" **Venice** or Strasbourg turpentine [99, p. 240]. These natural products varied considerably in quality and had highly individual characteristics. This was also true of rosins, of which many grades were available. Rosin is the solo residue left after complete distillation of turpentine.

Carton Pierre

Like papier mâché, this material employs paper pulp as a main ingredient. According to Millar, it was first introduced to Britain by a Parisian modeller, M. Miziere, and M. Hire, another Parisian modeller, made further modifications by turning the paper to pulp and adding plaster and dissolved glue. This remains unconfirmed however, and no British patent is registered in either name (if indeed they are separate names).

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[1] Mr. G. Baldwin, plasterer to W. Cubitt & Co., London, is said to have introduced the use of this material for the recipe. See Millar [36, p. 295]. However the reliability of this source may not be entirely sound.

[2] The term "turpentine" can be confusing as it is used ambiguously. Originally, the entire viscous exudates from coniferous trees were generally known as turpentine. Later the volatile distillate was called "spirits of turpentine". However, the term is now commonly used to describe the thin oily liquid used as a paint thinner and which is petroleum based.

Further changes were required, as the mix was still too coarse and these changes were effected by M. Romagnesi. It is said that crisp and delicate impressions could be produced from his formula, though exactly how this material compares with papier mâché is a matter for further research. Examples of work in carton pierre include Kilmainham Hospital in Dublin, (carried out by Jackson's and later restored by them in about 1900 [26]) and the apartments of the King's House at Sandringham [25, p. 395].

There are a number of different recipes for this material but the more important points are that English carton pierre was said to be a stronger mix than the French as the latter contained more whiting, reducing the setting time but resulting in a more brittle material. Among other materials, plaster piece moulds are said to have been used in its manufacture. Millar cites the use of metal moulds for stock patterns, and jelly or gelatine moulds (from around the middle of the nineteenth century) were also used [36, p. 292]. Again, it is Millar's text that provides information on pâte coulante, which was said to be a cheap liquid form of carton pierre; a mixture of whiting and plaster (presumably **plaster of Paris**) added to as much dissolved glue as would create a mixture that could be poured into moulds. Alum was added to increase the setting time of the plaster. This material was extremely brittle and thus not very durable. For this reason, paper pulp was sometimes added to the recipe [36, p. 293].

Cement

Today the standard ingredients of cement or ordinary Portland cement (OPC) are pulverised limestone and burned clay or shale. Portland cement superseded earlier forms of cement just before the middle of the nineteenth century. Its name derives from its resemblance to stone from the English Isle of Portland, a place noted for its limestone quarries. The ingredients, when mixed with water, sand, and gravel, form concrete. Cement was developed for exterior use, though it has been used for interiors.

An early cement, (again for exterior work) used in the late eighteenth century by Messrs. Parker and Co. was known as Roman cement for which a patent was taken

out (1796).[3] It set rapidly and therefore could be used for casting, like plaster but it provided greater strength. It seems to have been chosen above a number of other preparations, which were in use in the late eighteenth century. Indeed, its superiority over oil based compositions for exterior work used by the Adam brothers (and others) may have been a factor in the subsequent use of oil based compo primarily for interiors.[4]

Keene's cement is gypsum that has been heated to expel all the water of crystallisation. Alum or other salts are also added, the mix forming a very hard plaster for walls. Again this was a material for exterior use, patented in 1838.[5]

Coade Stone

Developed by Eleanor Coade (1733-1821) in 1769, this batch produced artificial stone was made from china clay, sand and finely ground stoneware that was put into moulds and fired at temperatures between 1100°C and 1150°C over a four day period. This produced a hard and partially vitrified material. It was used for a wide range of decorative architectural ornaments and sculpture, both for interior and exterior use or display, as Coade stone is acid resistant and weathers well. The factory finally closed in 1843 when production ceased and the formula was lost. It has only been re-discovered quite recently through analysis.

Colour References

Although general terms are used within the text to describe colours in the neutral area, they refer more specifically to 2 hues within which a sample of compo was matched using the Munsell system of color notation (Neighbouring Hues edition, Matte Finish Collection). The specific sample relates most closely to two values, the first more green, the second warmer and more golden:

HUE SYMBOL 5 Y, VALUE 7/, CHROMA /4

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[3] So called because its brown coloration was similar to a cement used by the Romans. James Parker (patent no. 2120), 1796. The abridgement cites a "Cement or tarrass to be used in aquatic and other buildings, and stucco-work". See also patent no. 1806 (1791) for earlier developments.

[4] Doran, Victoria, unpublished research into the involvement of the Adam brothers with patent compositions for exterior work.

[5] Richard Wynne Keene (patent no. 7580), 1838. This patent was for "Manufacturing cement; application of cements and other earthy substances, for producing ornamental surfaces."

HUE SYMBOL 2.5 Y, VALUE 6/, CHROMA /4

Other samples of compo were compared to this reference and did not all relate to these specific colours but were a close match to other colours within these two hues. The colour can vary quite considerable depending on the ingredient and their ratio in a given formula. The most dramatic change is noted when the quantity of whiting is altered.

Fibrous Plaster

It remains unclear whether this name actually refers to the same material as fibrous slab. One reference suggests that fibrous plaster was introduced into England by Jackson's who bought the patent rights from the architect Owen Jones, and acquired the recipe from the French inventor De Sachet [26].[6] In fact, it is the name Leonard Alexander Desachy, a Frenchman, who took out a patent in Britain in 1856 for "producing architectural mouldings, ornaments, and other works of art formed with surfaces of plaster or cement" from moulds.[7]

The first ceiling to be executed in this new material was the old St. James' Hall and competing plasterers tried to delay the work as much as possible by smashing the finished panels at night [55, p. 5]. They surely felt that this was a new material with which they could not compete in terms of time and cost, though lack of further references obscures the precise details. There are numerous subsequent examples of the use of this material, particularly in the late nineteenth century, confirming its widespread popularity.

Fibrous Slab

This is sometimes referred to as patent wood but again, it is likely that this apparently quite marketable name was applied to a range of imitative materials intending to resemble wood. It may also have been applied to the material known as fibrous plaster. A distinction is made by Millar who says that fibrous slab was the name given to the material patented by Bielefeld in 1851 that consisted of rolled slabs of

[6] How Owen Jones came to have the patent rights is a matter of further research.
[7] L.A. Desachy (patent no. 2494) 1856. See also Stagg & Masters [43, p. 3].

carton pierre.[8] It is alleged to be this material produced by Bielefeld that was used to line the dome (140 feet in diameter) of the Reading Room of the British Museum, designed by Sydney Smirke, in 1856, however this date again suggests a connection to what is known as fibrous plaster [36, p. 293].

Gesso

Gesso is a term applied to a viscous liquid made by combining an inert filler such as **whiting** or slaked **plaster of Paris** with an aqueous binder such as rabbit skin glue or gelatin. It is used to create the correct surface properties for receiving gilding, paint and other decoration and can be applied in layers, moulded (in shallow relief), modelled or carved [99, p. 306-8]. In Britain, gesso is made from whiting and is sometimes known as "whitening". Producing a picture frame moulding "in the white" refers to the fact that it has been coated with gesso made from whiting and is therefore ready to receive gilding or paint as required.

Lime Plaster

Lime plaster is a term which refers to the type of plaster commonly used for interior decoration in the eighteenth century and earlier, and for non-ornamental operations, (such as the plastering of walls) in the early nineteenth century, as Nicholson's 1823 description under the heading "Plastering" clarifies.

> Lime forms an essential ingredient in all the operations of this trade. This useful article is vended at the wharfs about London in bags, and varies in its price from thirteen shillings to fifteen shillings per hundred pecks. Most of the lime made use of in London is prepared from chalk, and the greater portion comes from Purfleet, in Kent; but, for stuccoing, and other work, in which strength and durability is required, the lime made at Dorking, in Surrey, is preferred [32, p. 369].

To make the lime-mortar, the limestone is first burned in a kiln (1000°c) to drive off carbon dioxide and forming calcium oxide (quicklime) to which water was added to form calcium hydroxide (slaked lime). An equal quantity of sharp sand (or sometimes slightly more) was then added to make lime mortar and to this, hair was added. This was called "lime and hair; or coarse stuff" used for the first layer of work [32, p. 371].

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[8] Charles Frederick Bielefeld, (patent no. 13,531) February 24th, 1851, for "Manufacturing sheets of pâpier-maché or substances in the nature thereof." See also Millar [36, p. 293].

The relatively slow setting time of the plaster meant that linear mouldings could be run in situ, detailed decoration could be hand-modelled and it could even be moulded where appropriate. Plaster that was purely lime based was commonly used for the initial, coarser layers of work in the first half of the nineteenth century. Finer layers usually included a quantity of true plaster or gypsum even in the eighteenth century and the need to retard the set was recognised at least as early as 1772:

> He [the plasterer or stucco-worker] changes sand, gypsum and lime, blended with water, into a paste. However the quantity of the gypsum of binding fast, which hinders the artist from elaborating the work of art, makes it necessary for the stucco-worker to add glue-water, for the glue-water retards the binding of the gypsum [102, p. 88].

Other materials could also be added for the same purpose, such as curd, sour milk, beer, alcohol, sugar. Glue and a number of these other ingredients, including sugar, also imparted flexibility, though as plaster recipes have not been the subject of specific tests (by the author), their impact is difficult to quantify. It may have been the addition of too much glue and experimentation with oils which also impart flexibility that led to the development of a flexible material that could be handled, removed immediately from the mould and applied to curved surfaces without distortion.

Linseed oil

Raw linseed oil is one of the four key components of the composition with which this thesis is primarily concerned and is intended to impart flexibility. It is extracted from the seed of flax (*Linum unitalissimum*). The method of extraction, quality of the seed and subsequent processing are all critical to the quality and properties of the oil of which many variations are possible.

Today, refined linseed oil comes in alkali refined, acid refined, boiled or oxidised form. The raw oil is obtained by either pressing (expelled oil) or by pressing followed by solvent extraction (extracted oil). It can vary in colour from a light yellow to a darker golden yellow, but is always very clean and clear. It is known as a drying oil and drying times, even for the raw oil are fairly rapid when compared to some other oils such as that extracted from the cotton seed. When boiled or extracted by

application of heat and pressure, it is darker, has a bitter taste and an unpleasant odour. This speeds up the drying action of the oil. For this reason, boiled oil has often been used in the preparation of house paints and decorative finishes. Heating the raw oil in the absence of air creates what are known as stand oils. This pre-treatment helps to ensure that at least part of the polymerisation process has already taken place before the film has formed. Consequently the films of such oils are far less susceptible to yellowing and form high gloss surfaces.

Linseed oil consists of fatty acid triglycerides and free fatty acids. Some of the fatty acids are unsaturated. (Linoleic acid makes up approximately 15 % and linolenic about 52 %. Saturated acids such as oleic, stearic and palmitic acids are found in small amounts). This means that oxidative cross-linking can occur quite readily and eventually lead to a three dimensional network polymer. Further oxidation can cause degradation of this network, with yellowing and embrittlement. Fresh linseed oil films are most soluble in non-polymer solvents. However more polar solvents including water do have the ability to swell older linseed oil films, where oxidative cross-linking is extensive. This is significant in the conservation treatment of objects with compo ornament.

Papier Mâché

This material is extensively described by Millar among other sources. An early reference is found in the writings of the scientist Robert Boyle (1627-91) who promoted its use on frames in around 1672 [10]. René Duffour and Peter Babel were frame-makers who advertised its use,[9] and William Wilton was another mid eighteenth century producer.[10]

In 1763, Babel stated that he believed himself to be:

> One of the first improvers of Papier Mâché ornament for Cielings, Chimney-pieces, Picture-frames, & c. an invention of modern date, imported to us from France, and now brought to great perfection [58].

[9] Duffour (carver & gilder) typically describes himself as the "Original Maker of Papier Machie [sic]". Heals & Banks Trade Card Collection, British Museum.
[10] According to Bradbury [55, p. 4]. Wilton was reputedly a plasterer who was also associated with the material known as "fibrous slab".

Papier mâché, as its name suggests, is French in origin. Millar refers to good examples in sixteenth century French buildings, including "The grand trophies and heraldic devices in the Hall of Henri II in the Louvre...". He also describes a building of later date, 1730: "a church built entirely of papier-mâché was erected at Hoop, near Bergen, in Norway". It is said that the sealant for this structure, which rendered it "waterproof and nearly fireproof" consisted of "vitriol water, and lime slaked with the whey and white of eggs". Other examples of its use during the eighteenth century can be found in houses such as Felbrigg, Doddington, Osterley and Kedleston. Thomas Chippendale also saw the advantages of such mouldings for certain situations and is reported to have bought several items such as room borders [103, p. 126].

During the nineteenth century papier mâché also became a significant part of Jackson's repertoire (**Fig. 5**) from the late 1830s. A name encountered in numerous sources, including patents and London trade directories, is that of E.F. Bielefeld.[11] Cubbitt & Co. and the well-known Birmingham firm of Jennens and Bettridge (among others) are mentioned in the Catalogue of the 1851 Crystal Palace Exposition. White and Parley, (White & Parlby) obtained a patent in 1858 in the manufacture of papier-mâché and carton pierre.[12] Finally, Millar mentions that "The dome of the Palais de Justice of Brussels" (built between 1866 and 1887 by Joseph Poelaert) "which weighs 16 tons, is composed of this material [25, p. 393]."[13] It would undoubtedly have weighed a good deal more and perhaps would not have been viable had it been made of composition.

Many different recipes and techniques for making papier mâché are described in detail in various sources. The majority of them are simple recipes using flour and water paste, although a whole variety of different ingredients were also employed such as glue, fine sand and chalk, certainly in the mid eighteenth century [104, p. 17]. Indeed the literature indicates that the materials used were in a constant state of development and change; sometimes old ingredients were re-used using a slightly

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[11] See also Appendix Two.
[12] The specification of this patent describes the casting of coloured inlays from either the same material or others within blocks (or other moulded forms) of carton pierre or papier mâché.
[13] This dome, which is said to have a surface area of approximately 26,000 sq. m. was badly damaged in World War Two and is therefore extensively restored.

different method of production, sometimes the set of ingredients were more unusual. The ingredients of the "permanent paste" described by Millar, included lead acetate (sugar of lead) and alum in addition to the usual flour and water [36, p. 291]. Resin and glue were also occasional ingredients. Millar also provides a fairly concise description of the basic process as it was in 1927:

---Papier-mâché work usually requires a back and front mould of brass for a cast generally about 1/8 in. The paper and ingredients are mixed up in a machine, rolled into sheets of the required size, placed into moulds, and subjected to hydraulic or screw pressure. The casts are placed in a drying room to harden, and when dry trimmed and finished. .... The moulds are made of brass, copper, metal, boxwood, or sulphur [36, p. 290].

As regards the making process, the paper could either be mashed to pulp (by machine as things became mechanised) or layers of paper were glued together and placed under high pressure until the layers became laminated. Both methods are recorded in the eighteenth century. For example, Robert Boyle in his "Uses of Natural Things" advocated soaking paper in hot water before mashing it to a pulp [105, p. 12-15]. Decorative papier mâché borders or "fillets" of the laminated variety have been noted along the dado decoration of the Tapestry Room at Osterley Park, dating them to the 1760s (**Fig. 4**).

The laminated or layered paper method continued to be used as it has often been noted on objects such as chairs from the mid-nineteenth century, where a frequent break, usually in the back, reveals layers of fairly thick paper. It is known that sheets of paper were pasted together and the shape was cut out/pierced and pressed (usually by machine in the second half of the nineteenth century) into the curved shape or the article if required. It was usually necessary to trim off imperfections at the very least, if not spend some time reshaping by hand. This was still infinitely faster than hand carving but more finishing seems to have been necessary than for compo ornaments.

Pastiglia

This has been described as a mass containing gypsum and animal glue, which has been used in Italy since the Middle Ages for the decoration of furniture. It is essentially gesso, which is usually applied to lightly curved profiles by building up a

thickness with a fine brush; the gesso can either be dropped from the brush or applied directly for more control over the work (**Fig. 1**). It can also be used with moulds (**Fig. 2**). It is important to note however that gypsum (or whiting) mixed with glue alone will set adequately in very shallow moulds or low relief, but does not have the strength or flexibility for anything more substantial. Therefore such ingredients were confined to shallow, although not always so rudimentary patterns. Even in this country such techniques were in use as early as the fourteenth century (**Fig. 3**) but it is the term is most commonly applied to the Italian brush and stick techniques. On picture frames, pastiglia surfaces are stained with colour and frequently gilded. The richest examples of pastiglia work can be found in the Venetian frames of around 1500.

Plaster of Paris

Plaster of Paris and gypsum were used in some of the earliest civilisations [99, p. 489]. Plaster of Paris is prepared from calcium sulphate (gypsum, $CaSO_4 \cdot 2H_2O$) that has been heated to between 212-374^0 F. This drives off three quarters of its water of crystallisation becoming $CaSO_4 \cdot {}^1/_2H_2O$, or plaster of Paris. When this material is mixed with water to form the consistency of thick cream it takes up this lost water once again and sets hard to become inert. It will not react further with water.

Plaster of Paris has been used, and indeed is still used, for mould making because it has the advantage of setting very rapidly when combined with about $^1/_3$ of its weight in water. It sets without significant evaporation of water and thus the mould does not shrink unlike most other moulding materials. (Plaster of Paris sets because it is partially soluble in water and that small quantity in solution crystallises out and joins with the insoluble particles). The addition of a very small amount of glue, whether it is animal or fish, will retard the set considerably and thus plasters with different settings are sold ready-made. Glue size has also been frequently found in lime plaster. As it retards the set of gypsum-based materials, this is why a percentage of gypsum is sometimes found in **lime plaster**. It is known that glue size was used with gypsum-based plaster for the final layer of both internal and external plastering work.

In terms of usage, most particularly in an ornamental context, Peter Nicholson is worthy of attention:

The composition, known as PLAISTER OF PARIS, is one on which the Plasterer very much depends for giving the precise form and finish to all the better parts of his work; with it he makes all his ornament and cornices, besides mixing it in his lime to fill up the finishing coat to the walls and ceiling of rooms [32, p. 369].

It is important to remember that by 1823, ornamental cornices were no longer made from a lime-based formula but were all cast entirely in plaster of Paris, or alternatively, by this stage, compo. Plaster of Paris could not be used for the hand modelling of interior ornament during the eighteenth century and earlier because of its rapid setting time. It is worth briefly mentioning traditional casting processes for architectural ornament as they are cited in an early nineteenth century trade manual to help clarify how compo evolved among prevailing practices [32, p. 377].

...whereas they were formerly the work of manual labour, performed by ingenious men, then known in the trade as ornamental-plasterers. The casting of ornaments in moulds has almost superseded this branch of the art; and the few individuals now living, by whom it was formerly professed, are chiefly employed in modelling and framing of moulds.

All the ornaments which are cast in Plaster of Paris, are previously modelled in clay. The clay-model exhibits the power and taste of the designer as well as that of the sculptor. When it is finished, and becomes rather firm, it is oiled all over, and put into a wooden frame. All its parts are then re-touched and perfected, for receiving a covering of melted wax, which is poured warm into the frame and over the clay-mould. When cool, it is turned upside down, and the wax comes easily away from the clay, and is an exact reversed copy. In such moulds are cast all the enriched mouldings, now prepared by common plasterers. The waxen models are made so as to cast about one foot in length of the ornaments at a time; this quantity being easily removed out of the moulds, without the danger of breaking.

Pearl or Scotch glue

Animal glue is the most important of the components in composition and essentially provides its thermoplastic qualities. Scotch, pearl or bead glue (because it comes in bead form) as it is most generally known, is a commercial product of high molecular weight therefore high strength. It is made from the proteinaceous connective tissue in the bones of most farm animals. It is not as pure as glue made exclusively from the hide of the animal, such as rabbit or calf skin glue and is therefore unsuitable for use in gesso as a ground for gilding. Many historical recipes for compo use old names to

refer to various qualities of scotch glue, no longer recognised under such names.

The proteins in the glue consist of collagen and other components and the collagen is composed of chains of amino-acids. The bonds between these chains can be weakened and eventually disrupted by treatment with water and heat. Some chain-shortening also occurs via hydrolysis of the peptide links. The result is the production of a water soluble proteinaceous glue, the main constituent of which is gelatin. The molecular weight distribution of the gelatin governs the properties of the glue. To re-dissolve the solid "pearls" or granules, most composition recipes either specify or require that they are just covered by water in a container overnight. A solution is then formed by heating the gelled glue and water in a pan.

In usage the glue solution first sets or gels. It is the second part of the process, drying or hardening, that involves the loss of water. This causes shrinkage and thus plasticisers (and humectants) such as glycerol, sorbitol and honey are sometimes added to reduce the extent of water loss and hence the shrinkage.

On drying, secondary bonds are re-established between the long gelatine molecules. These give glue its strength. However, as no primary bonds are formed, the glue remains susceptible to moisture and heat, as does compo.

Rosin

Rosin is one of the four components of composition as known today. Also known as colophony, it is a hard, brittle, translucent, usually amber-coloured resin that is excreted by varieties of pine tree such as larch, spruce and fir. The raw balsam or gum (turpentine) is extracted from the trees and distilled to produce spirits of turpentine; the residue in the stills after distillation is rosin. At this stage the residue is still very dark and requires further purification to create the more familiar transparent, brittle material. Today rosin is produced by the sulphite process as a by-product of the recovery of cellulose from wood.

Rosin softens when heated to about 80°c and melts between 120°c and 135°c but is insoluble in water. Rosin is also soluble in alcohol, acetic acid, ether, other organic solvents and hot alkaline solutions. The latter produce resin acid salts or rosin soaps

because rosin contains mostly diterpenoids which are known as resin acids. On a molecular level, the ageing of Pinaceae diterpeoid resins is predominantly the result of the oxidation of these abietane diterpenoid acids. The acids are oxidised to form dehydroabietic acid (DHA) which can be oxidised further by incorporation of oxygen atoms. The precise mechanisms involved in this oxidation process are complex and are the subject of scientific analysis, therefore it is not possible to accurately identify the specific physical short or long-term effects of the chemical properties of rosin in composition.[14]

Nevertheless, certain basic physical properties can be identified. For example, heat sources such as sunlight will cause rosin to become tacky due to its low melting point, in addition to an increased sensitivity to water and a tendency to powder. It will react with basic pigments and cellulose as it is highly acidic but again, what effect, if any, this may have in compo and on a particular coating is uncertain. Solvents will not evaporate readily from the material causing it to remain tacky for long periods of time if they are absorbed. As rosin does not shrink a great deal on cooling, it is ideal for use in compo, but its tendency towards oxidation (resulting in a colour change in the rosin itself) is an important contributory factor in its degradation. It is extremely brittle due to its small molecular size, which means that composition, although extremely hard when dry, is also very susceptible to shattering and therefore fixings can only be applied when the material is still in the setting stage.

Rosin is sold in at least a dozen grades ranging from the straw coloured 'water white' and 'window glass' to dark treacle colours; the latter have the most impurities. The name "colophony" referred to by historical sources, is a name deriving from Colophon, a city in Ionia [99, p. 232]. This name is sometimes said to be obsolete but it is still used to refer specifically to rosin, the non-amber forming resin from the Pinaceae family, as distinct from other resins from different families of conifer. Other old names include Greek pitch and "sound glue", which is said to derive from its use on violin bows.

As one of the cheapest natural resins, rosin has been widely used over the centuries in

[14] Klaas Jan van den Berg, *Diterpenoid resins identification and behaviour in paintings*, a project that has been finalised and will appear as a MOLART Report (Progress Report 2000).

the production of a variety of materials such as paints, varnishes, putties and soaps. It was reputedly used as early as the ninth century in oil varnishes but is really unsuitable for paints and varnishes because it will cause cracking and discoloration, though it is likely that it was used in the adulteration of more expensive resins such as Venice turpentine.

Stucco

Like composition, this word is often used to refer to materials outside this definition and much confusion still exists between the terms "stucco" and "plaster". Stucco is the Italian term, which is now generally associated with an exterior mortar made predominantly of lime but it is also frequently used to refer to any plastering material that can be applied to the whole or any part of a building, both for plain and ornamental work.

Sugar

This is sometimes found in recipes for composition. It is intended to impart pliability and to help the glue to amalgamate with the oil/rosin mix. It is also a humectant, retaining water and absorbing moisture from the air, thus prolonging the working time of the composition in its gel state.

Venice turpentine

Venice turpentine, like **Burgundy pitch**, is by no means common to most historic compo recipes but certainly worthy of mention. Unlike Burgundy pitch however, it has a long history of use in artists' mediums. This is because it forms a stable emulsion when mixed with drying oils and tempera mediums, producing a satisfactory, durable and non-yellowing film.

Venice turpentine is made from the resin of the Austrian larch (*Larix decidua*). It is a viscous, clear liquid with a strong pinaceous aroma (consisting of 14% resins, 20% terpenes and 63% resin acids) and it is clear because it contains no crystals of abietic acid, unlike other turpentines.

Whiting

Whiting is the inert filler common to most composition recipes. Older references such as those with which this thesis is concerned, relate to the refined form of the native calcium carbonate ($CaCO_3$). Whiting is a material generally used in Northern Europe being most commonly mined there, as opposed to gypsum (calcium sulphate $CaSO_4$), generally used in Italy. The latter is not suitable for use in composition as it causes oil films to become brittle.

The addition of this filler to the recipe provides the bulk and therefore reduces the volume of the other ingredients (and the overall price), thus restricting the possible shrinkage [106, p. 178]. When the filler is added to the "liquid" polymer, in this case the rosin, oil, glue and water, the liquid part fills the void between the particles of the filler. Hence the size of particle is fairly crucial to the outcome. The ideal is for the filler to have both large and small particles so that the voids left by the large particles will be filled by the smaller ones. The remaining voids must be filled by enough of the liquid polymer for a structure that will retain its strength. Thus the physical characteristics of the inert filler influence the mechanical properties of a polymer. These differences are a result of the nature of the impurities and the shape and size of the particles.

$CaCO_3$ = natural chalk = whiting = marble dust = limestone

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