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VARNISHES

Authenticity and Permanence

Colloquium - 19-20 September 1994

By Leslie Carlyle and James Bourdeau

VARNISHES

Authenticity and Permanence

Since the commercial introduction of synthetic resins in the 20th century, conservators have been faced with a wide variety of choices of surface coatings for paintings. The objective of early research was to develop serviceable coatings with exceptional stability and longevity to reduce the frequency of varnish removals to which a painting must be subjected. Since then, some conservators have rejected the synthetic resins on the basis of aesthetics, while others have rejected the natural resins because of their impermanence. Coatings research has followed this debate regarding longevity versus appearance, first in searching for more stable substitutes for natural resins (e.g., PVAs and acrylics), and more recently in attempts to stabilize natural resins and to develop stable synthetic varnishes that have handling properties and an appearance similar to those of mastic and dammar (i.e., low viscosity, low molecular weight, high refractive index). Now that authenticity—a concept important to late 20th-century historical studies—has become a significant factor in our approach to treating paintings, this debate must necessarily be carried even further.

The search for an “authentic” appearance recognizes the importance of the period in which a work was created as well as what we can determine of the artist’s original intent. Are we always certain about what should be varnished and what should not? Should varnish be applied only to certain areas of medieval gilded panel paintings? Are conservators justified in thinking that they are achieving an authentic appearance simply by using dammar in a modern petroleum solvent fraction when the surface of a painting from a particular period may have been coated originally with mastic, or even with a cooked oil-resin varnish? To what extent are conservators willing to trade reversibility for authenticity?

In light of the concept of authenticity, it is time to reconsider varnishing options, taking into account recent research. In this Colloquium, delegates will explore the advantages and disadvantages of various old and new surface coating materials, and will discuss the methods available to increase the longevity of traditional resins and the stability of newer synthetics.

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An Overview of Research on Picture Varnishes

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An overview of research on picture varnishes conducted in recent years at the Metropolitan Museum of Art in New York and the National Gallery of Art in Washington will be presented. Paintings have been varnished, that is, have received a final transparent coating, almost universally until the late nineteenth century. Thereafter, artists often chose not to varnish their paintings. Traditional varnishes are either oil varnishes, which are prepared by boiling a natural resin together with a drying oil, or spirit varnishes, which are solutions of natural resins in a volatile solvent. Oil varnishes are no longer commonly used. Today, dammar resin and gum mastic are the natural resins most commonly used in spirit varnishes.

Although varnishes provide some protection against mechanical abrasion and against dirt and dust deposits, they give little protection against other effects of the environment. They are transparent to ultraviolet (UV) and visible light, and oxygen and other gases diffuse through them easily. Varnishes, however, greatly influence the appearance of paintings. Varnished paintings in general have more saturated colors and are glossier than unvarnished paintings. The final appearance can be controlled by the method of application and by the addition of matting agents.

Natural resin varnishes degrade rapidly due to autoxidation reactions, which cause yellowing, loss of transparency and gloss, cracking, and loss of solubility in nonpolar solvents such as mineral spirits. Polar solvent mixtures, which are required to remove aged varnishes, may cause swelling and leaching of underlying paint layers. Synthetic polymeric varnishes, which were introduced as early as the 1930s as replacements for unstable natural resin varnishes, often do not produce the same amount of gloss and color saturation as traditional varnishes. Some polymeric varnishes crosslink when they age, resulting in their becoming completely insoluble.

It was shown that synthetic resins with a low molecular weight (LMW) and a relatively high refractive index should be used to imitate the appearance achievable using traditional picture varnishes. Apart from ketone resins, no synthetic LMW resin has been available to paintings conservators until recently. Ketone resins degrade rapidly due to autoxidative reactions. Chemically reduced ketone resins are somewhat more stable but are also very brittle.

The light and heat aging of dammar films was studied extensively. Changes in the films were measured using a variety of analytical methods. Extensive autoxidation occurs only in the presence of light, although limited yellowing takes place under such conditions. Autoxidation leads to the formation of products containing polar groups, particularly carboxylic acid groups. Consequently, the oxidized resin is soluble only in relatively polar solvent mixtures containing, for example, acetone or an alcohol. The monomeric fraction (triterpenoid fraction) disappears and oligomers are formed. No insoluble fraction due to crosslinking reactions is formed. Yellowing is mainly the result of secondary non-oxidative thermal reactions occurring among autoxidation products. Intense yellowing and UV-fluorescence occur when light aging is followed by a brief period of heat aging in a nitrogen atmosphere. Yellow films bleach when exposed to visible light.

The possibility of inhibiting the photochemically initiated autoxidation of dammar films with stabilizing additives was investigated. Although no stabilization is obtained in the presence of UV light using currently available additives, a remarkable stabilization occurs when a hindered amine light stabilizer (HALS) is used and when UV radiation is eliminated. The latter was achieved by placing a filter with a cut-on wavelength of 400 nanometers in front of the sample. HALS-stabilized dammar films remain intact when aged in a xenon arc Weather-ometer under exclusion of UV light for as long as 6000 hours, while unstabilized films break down in a few hundred hours. Yellowing and UV-fluorescence do not occur in light-aged dammar films containing HALS when they are subsequently heat aged. Films of gum mastic are stabilized less than dammar films by the addition of HALS, but mastic varnishes may still benefit substantially from the addition of HALS if used in a UV-free environment.

The stability of several LMW synthetic resins hitherto not used in the conservation field was tested. These include commercially available hydrogenated hydrocarbon resins and an experimental aldehyde resin. The resins, all of which are soluble in low-aromatic hydrocarbon solvents, were aged in a xenon arc Weather-ometer without using UV-absorbing filters. Unstabilized and HALS-stabilized films were aged. These new resins proved considerably more stable than natural and ketone resins. HALS-stabilized films last for at least 6000 hours without significant autoxidative degradation and without losing solubility in low-aromatic hydrocarbon solvents. Polymer additives for the LMW resins were also tested. These may modify working properties of the varnishes and the appearance that can be obtained using them, and they decrease the brittleness of the dry films. Synthetic rubbers were added to hydrogenated hydrocarbon resins and poly(n-butyl methacrylate) was added to the aldehyde resin. HALS-stabilized films of LMW resin/polymer mixtures are stable for more than 6000 hours of Weather-ometer aging. No insolubility caused by crosslinking has been noted in these films. Many paintings conservators have gained experience with these new varnish materials and have reported that an appearance similar to that obtained with natural resin varnishes can be achieved.

Synthetic Resins as Surface Coatings

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After the 1930 Rome conference of conservators, an international committee concluded that no ideal picture varnish existed. For conservation purposes, committee members recommended an initial varnish of dammar or mastic, applied thinly to limit the visual effect of yellowing as the varnish aged, followed by a protective layer (against humidity and pollutant gases) of wax.

This recommendation acknowledged the limitations of natural resins as varnishes for paintings, and sought to minimise these limitations through the method of application. At the time, it seems that no synthetic materials were considered to have better all-round properties than the natural resins. George Stout's dramatic statement that poly(vinyl acetate) (PVA) was "probably the varnish of the future" was the first step in a long (and often abortive) search for synthetic resins that surpassed dammar and mastic in terms of stability and removability and that reproduced something of the optical qualities associated with these natural resins.

Poly(vinyl acetate) was adopted as a picture varnish in some circles surprisingly early. Although PVA may fulfil some of the criteria for conservation varnishes on account of its chemical stability and removability, its use in the field has been limited by concerns over physical properties. Its low refractive index and high-viscosity solutions tend to produce relatively poor saturation and gloss, and the inherent colour stability of the resin can be severely compromised by a tendency to attract and absorb dirt.

Acrylic ester resins and polycyclohexanone oligomers (ketone resins) were introduced in the late 1950s. Although widely used over the last 30 years, resins from both groups (e.g., Paraloid [Acryloid] resins B72 and B67, Laropal K80) might now be considered problematic in terms of appearance and stability. A consideration of these issues may illustrate the frameworks conservators use to justify the selection of varnish materials and the extent to which those frameworks may be influenced by minor manufacturing variations in commercial products and the availability of viable alternatives. The presentation will pay particular attention to conservators' continued use of ketone resins as picture varnishes despite evidence of limitations with regard both to ageing and to the relationship of concerns for stability and aesthetic considerations.

The poorer saturation and gloss associated with high-molecular-weight, low-refractive-index resins can, to some degree, be compensated for by layered varnish systems. Some options for layered approaches will be discussed in the context of restoration practices and in relation to recent developments in varnish materials.

Although the resins mentioned have been the most widely used synthetic varnish materials in recent years, several other polymers, including higher acrylic esters, silicones, and poly(vinyl alcohol), have at times been proposed as varnishes. These materials will be discussed insofar as they demonstrate particular issues with regard to ageing or appearance.

Paraloid (Acryloid) B72 as a Varnish for Paintings

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Many paintings are susceptible to solvents to some degree, and repeated cleaning will leach out shorter chain components of the paint film. When removing a discoloured varnish, there is a strong argument for replacing it with a very stable varnish, thereby freeing the painting from the "varnish removal cycle". Paraloid B72 has been used as a varnish for at least 30 years. Its one overwhelming advantage is its chemical stability, which has been predicted by artificial ageing and has now been proven in practice. It remains clear, colourless, and resolvable.

Not all of Paraloid B72's properties are desirable. For instance, during application, Paraloid B72 is normally dissolved in aromatic hydrocarbons, which are a serious health risk. Paraloid B72 does not always wet surfaces well, particularly partly removed degraded varnishes. The film it forms is unlike traditional dammar or mastic varnishes, being characterised by low gloss and a tendency to follow the surface texture of the painting. This has been attributed to the fact that Paraloid B72 is a high-molecular-weight polymer with a relatively low refractive index (1.48) and that its concentrated solutions have a high viscosity. The dried film is a poor moisture barrier and tends to develop an electrostatic charge, attracting particulates from the environment.

Despite these drawbacks, Paraloid B72 may sometimes be the only acceptable varnish. For instance, B72's solubility and stability (non-yellowing) are critical for a painting that is soluble in commonly used solvents or for one that has insufficiently bound pigment. Indeed, it has replaced natural resins in commercial fixatives for charcoal or chalk on paper.

Even though much effort has gone into finding stable replacements for dammar and mastic varnishes, there are still many occasions when a thin, low-gloss varnish is the most appropriate for a painting. The aesthetic requirements of a varnish depend not only on its optical properties but also on the illumination. In an interior lit with a soft, warm light, gloss has many advantages and yellowing is not a serious drawback. In a cool, diffusely lit gallery, an even sheen may well be preferable and any colour distortion is much more significant. The overwhelming majority of paintings are seen in skylit galleries. Under such conditions, Paraloid B72 is appropriate and can be adapted to produce a useful range of surfaces.

During the nineteenth century, gloss varnish became associated with the Academies and with the concept of finish. By the second half of the century, artists began to challenge this concept, exhibiting unvarnished works. Watercolours and sketches were also popular. In the twentieth century, informal presentation and a concern for the creative process have increased awareness of the surface characteristics of paintings and their supports. Artists now rarely apply a varnish; for example, it would be undesirable to do so on acrylic paintings. Protecting such surfaces is a problem. On occasions, a light spray of B72 can be used, preserving the brushmarks or canvas texture but providing a stable, cleanable film.

When and With What to Varnish—Some Practical Considerations

Anne Ruggles
National Gallery of Canada
Ottawa, Canada

A number of paintings dating from the early 1920s are being examined, treated, and cleaned in preparation for the "Group of Seven" exhibition currently being organized by the National Gallery of Canada for the fall of 1995. In some cases, the intimate marriage of paint films and resinous coatings have necessitated both partial and selective approaches to varnish removal. Fluorescence microscopy of paint/varnish sample cross-sections has been used to better understand the interface between pigment and varnish.

The interactions I observed in these cross-sections at the paint/varnish interface caused me to reassess the timing of re-varnishing and the selection of varnishing agents. In the past, issues such as gloss, saturation, and resin cross-linking were the major factors in my judgements regarding re-varnishing. Now, I consider two additional factors: the desire to maximize the interval between cleaning and re-varnishing, and the desire to minimize the power of the varnish solvent. I have altered my methods of re-varnishing to accommodate these two factors. In this presentation, I will share the observations that I have made in this regard and will describe how these observations have influenced my practices.

Aspects of Varnishing Historical and Contemporary Paintings

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Painters have always been obsessed with technical change. They have struggled with problems such as finding the "perfect" medium, the "perfect" varnish, the "perfect" colour, thinking that if the "perfect" image could be created something magical would happen. In a sense, conservators have, in the past few years, addressed similar concerns by considering whether a painting does in fact need a varnish and how certain varnish options age both physically and aesthetically, and by attempting to understand the intent and context of a painting. Recent research has given conservators a greater knowledge of "safer" materials and technical options.

Like many conservators, I have spent a great deal of time visiting art galleries. I have often observed that in a retrospective exhibition displaying one artist's works from many institutions, the paintings appeared dissimilar. Conversely, specific institutions have homogeneously presented a broad range of schools of paintings that had all been treated by one specific approach. If one particular varnish philosophy is continually presented, its "look" can be recognized. Inflexible individual varnishing approaches to finishing paintings can do a great disservice to individual pictures and to their authors.

Inflexibility of treatment flies in the face of the fact that most conservators are taught to leave as little of themselves, their time, or their materials with the painting. We know, of course, that this is to some extent an unattainable goal because all forms of treatment alter a painting in one way or another and because we are all products of our time. These realities can show and, on occasion, should show.

This presentation will discuss the aging characteristics of certain varnishes and the results of certain materials and methods of application from an aesthetic, and therefore personal and subjective, point of view. The finishing of paintings, in institutions at least, should be a shared responsibility between curators, conservators, and artists when appropriate. Various varnish approaches can be completed with sensitivity to vastly different paintings while adhering to conservation principles.

Some Examples of the Identification of Natural Resin Varnish Components in Paintings

Raymond White
National Gallery
London, England

Analyzing natural products, such as natural resins in varnish, has always been a taxing undertaking. In the case of natural products encountered in museum objects and archaeological artifacts, the inherent difficulties are compounded by the restriction on sample size. The problems are accentuated by the increasing complexity of the mixture and by the general increase in the polarity of oxidation products, induced by lengthy periods of ageing and exposure to the ambient environment.

The case of easel paintings in many ways represents an extreme. Varnish additions may be present in the medium of the painting; the paint may also be complex in terms of layer structure. The medium will have undergone centuries of thermodynamic and photolytic chemical change. Above all, only the smallest sample sizes are permissible.

In essence, the problem of identifying organic materials within such samples comes down to analyzing the material in order to establish the presence of a range of possible source-indicator compounds. Often, it is not possible to find indicators of such a specific nature as will point to the precise origin of the material. Compounds may well merely suggest a particular botanical or zoological genus, or even a family or sub-family. Such compounds, of use to the analyst as indicators, may be either primary or secondary.

A primary compound is one that is present in the fresh material in reasonably substantial amounts and that possesses a chemical structure that is relatively stable to thermodynamic change and to photolytic bombardment in the presence of oxygen. A secondary compound is not an original component of the material, but is formed from a primary indicator present in the fresh product that has degraded or changed into other products during the ageing process. These products in turn should be reasonably stable in order to serve any useful analytical purpose. Although the primary indicator may no longer be above the detection threshold in a sample, the oxidation/degradation product(s) nevertheless grow steadily with time and are detectable.

In some cases, a material may have several indicators of one kind or another, which in themselves may point to several genera. The absence of certain indicators may further restrict the range, possibly to a single genus. Occasionally, a quantitative assay on the relative amounts of such indicator compounds may permit further refinement of the classification process and may establish the actual species of origin.

This lecture will concentrate on some aspects of this problem and will be illustrated with specific examples of the choice of potential primary and secondary indicators. Emphasis will be placed on various triterpenoid, Coniferae, and Leguminosae-based varnishes. The lecture will also address the much neglected topic of contamination sources and working practice.

The Mass Spectrometric Identification of Natural Resins and Their Degradation Products In and On Paintings

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There are now new approaches in examining molecular signatures of paintings. High-temperature gas chromatography mass spectrometry (GCMS) and direct mass spectrometry (MS) using pyrolysis MS (PYMS), fast atom bombardment MS, electrospray MS, and laser desorption MS offer new ways to examine the organic binders and additional components present in works of art. MS techniques are universal and are highly sensitive to chemical structure variations. They make it possible to determine the original media used by the artist more accurately, and to examine degrees of cross-linking and the states of oxidation and hydrolysis.

Temperature-resolved analytical pyrolysis high-resolution MS gives information on the volatile physically absorbed fractions such as oils and waxes; on the constituents of the macromolecular network such as proteinaceous substances, lipid-polymerisation products, polysaccharide gums, varnishes, resins, and some inorganic components (carbonates, sulphates, sulphides, chlorides); and on some metals (Na, K, Rb, Cs, Ca, Mg, Sr, Ba, Pb, Cd, Hg, Zn). The application of various ionisation techniques (i.e., low- and high-voltage electron impact, chemical ionisation, thermal ionisation, electron attachment negative ionisation) gives pyrolysis MS a broad chemical compound sensitivity.

High-temperature GCMS of solubles by direct derivatisation of complex samples avoids workup procedures and shows a chromatographically resolved broad spectrum of soluble and/or weakly bound constituents in the sample.

On-line pyrolysis GCMS of polymerised matrix constituents is used for the compound-resolved analysis of thermally dissociated polymers and of polymerised network molecules. This technique is widely used for the analysis of synthetic polymers and is therefore suitable for modern paint materials and for polymer construction materials. Addition of derivatisation agents in the pyrolysis stage (reactive PYMS) protects certain labile molecules and gives a much better chromatographic resolution and compound transmission.

These analytical MS approaches are being used at the FOM Institute to study artificially aged media and real samples from oil paintings by Rembrandt van Rijn, Ferdinand Bol, J.M. Turner, J.M. Whister, S. Spencer, and others. In the course of these investigations, we have also examined varnishes on and residual resin fractions inside the paint layers. In some cases, the varnishes are modern synthetic resins that have penetrated the paint layers. In other cases, we have seen moderately to strongly oxidised di- and triterpenoids. Comparative studies were performed on a number of natural resins and on their artificially aged derivatives in order to relate the direct MS information to chemical structures. The analytical protocol and a number of case studies will be discussed. Comparative data will be reported on colophony, various copals, sandarac, dammar, mastic, shellac, and several hard ambers.

Reproducing Traditional Varnishes: Problems in Representing Authentic Surfaces for Oil Paintings

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In recent years, many paintings conservators familiar with synthetic resins have been returning to the use of natural resins or have been turning to newly introduced synthetics which attempt to reproduce the effect of natural resins more closely. Some are making this choice on the basis that the natural resin or its synthetic imitation can achieve a surface more like the appearance of the original, or traditional, varnish.

Many assume that dammar is a good example of an original varnish. In fact, dammar was apparently introduced only in the nineteenth century. Although it may have been popular in Germany, it was not widely adopted in Britain, where mastic was the only spirit varnish recommended for paintings throughout the nineteenth and well into the twentieth century. As well, spirit varnishes have not been used exclusively; oil-resin varnishes have had an even longer history of use. Although oil-resin varnishes are certainly not a desirable alternative for a paintings conservator today, our view of what could have constituted an original varnish must include these materials as well.

If we are going to adopt natural resins on the basis of an "authentic" appearance and search for alternative synthetic materials which better replicate the appearance of natural resins, then we should consider more closely what was actually in use at a given time and place. Are mastic and dammar actually as interchangeable in appearance as has been assumed by some twentieth-century researchers, and how do these spirit varnishes compare with oil-based varnishes?

Before we are able to explore the subtleties of perceptual differences in colour, gloss, and saturation of the most popular traditional varnishes, including those made using oil, we need to provide ourselves with examples.

This paper will explore the problems inherent in reproducing traditional varnishes from old recipes. The recipes chosen will concentrate on those found in British eighteenth- and nineteenth-century sources. Issues such as the current availability of some resins and the importance of reproducing the equipment and conditions of manufacture will also be considered. The final colour and viscosity of the varnishes and the variation in solvents used will be discussed.

Yellowness and Removability: How Much Change? How Fast? How Important?

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Yellowing data for varnishes has been published using a variety of units of measure and a variety of ageing regimes. One rarely has a clear sense of how a realistic varnish application will look in 100 years. Neither does one know how unacceptable, or acceptable, the varnishes that were rejected because of yellowing will appear, especially those that have other desirable properties. Caution on the part of the researchers is reasonable, but part of the problem is simply their narrow focus. Most of the studies address a particular hypothesis within a small set of materials and do not provide overall advice to the user. There is no reference to a common set of measures and materials, let alone to a set based on appearance or acceptability.

This review will chart all the possible data by a common axis of yellowness and by a common time axis, and will show the effect of thickness on yellowing. Obviously, extrapolations from accelerated ageing studies can only be approximate, but, taken as a whole, they can provide upper and lower limits. Natural ageing studies, though rare, will be emphasized because they provide benchmarks. Users' experience will also be placed in context. A known varnish of a known age on a painting, given even very rough estimates of yellowness and thickness, will provide further points on the chart.

The inter-relation of yellowness, perceptible yellowness, unacceptable yellowness, light source, and the colours below the varnish will be reviewed briefly.

Removability studies have the common measure of Feller's swab test with cyclohexane/xylene/acetone mixtures. But it is the very universality of this test that limits these studies. The test is useful in determining the varnishes most likely to remain removable with low-polarity solvents, but not in exploring removability of less stable varnishes or very aged "stable" varnishes. The swab test also fails to distinguish true dissolution from abrasion of a gel or leaching of a partially cross-linked gel.

Some unpublished data on solubility of dammar varnishes, naturally aged (15 years) with and without antioxidant, will be presented. This study showed that the antioxidant did prevent most of the change in solubility of the dammar, but that the old "unstabilized" dammar was readily soluble in a range of alcohols that did not dissolve either fresh dammar or old stabilized dammar. Further, if a solvent mix dissolved any of the dammars, it did so very quickly: 40 μm to 80 μm per second. The change from dissolution to swelling was quite precise as the solvent ratio changed in some mixtures.

Using UV Absorbers in Acrylic Top Coats as a Remedial Treatment for Dammar Varnishes Containing Irganox 565

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Interest in the use of polymer stabilizers and ultraviolet (UV) absorbers in conservation has developed as these additives have undergone refinement for the paint and coatings industry. At the same time, our understanding of the processes of photodegradation of organic materials has increased substantially. Early applications in the field occurred in the late 1960s with efforts by Robert Feller to inhibit the cross-linking of Elvacite 2046 (50:50 iso-butyl-co-n-butyl methacrylate) films with dilaurylthiodipropionate (LTDP) films. In 1976, Feller predicted that "antioxidants will surely play a role in conservation materials of the future."

Over the past two decades of working with synthetic polymer coatings, research into the stabilization of varnishes shifted its emphasis from synthetics to natural resins. In this vein, Raymond Lafontaine made a preliminary attempt to stabilize dammar coatings under thermal ageing conditions with Irganox 565 (Ciba-Geigy) in the late 1970s. Ten years later, René de la Rie showed that Irganox 565 breaks down under UV photo ageing, which affects both yellowing and solubility of dammar. He proposed a theoretical model suggesting that, under UV exposure, Irganox 565 forms yellow-coloured decomposition products that are responsible for the increased yellowing observed in films containing this anti-oxidant. In the 10 years between the publication of Lafontaine's and de la Rie's findings, many conservators had used Irganox 565 in their dammar varnishes for paintings. This is not a problem under museum lighting conditions; however, under uncontrolled lighting conditions, this additive could yellow.

This paper proposes a remedial treatment for paintings varnished with dammar containing Irganox 565. Top-coating this film with a UV-absorbing acrylic varnish may slow the yellowing of this additive when the painting is exposed to UV. Reflectance colorimetry of samples of dammar alone and of dammar with 1% Irganox 565 will be performed before and after UV exposure. Results will be compared to those of dammar with 1% Irganox 565 that has been top-coated with Acryloid B-72 containing 3% Tinuvin 327 or Tinuvin 1130, both UV absorbers. The usefulness of this procedure for re-treating paintings several years after their initial coating with dammar and Irganox 565 will be discussed.

Part of this paper will focus on the feasibility of using an acrylic top coat varnish where the appearance of an historically "authentic" varnish is sought for paintings of particular schools. Gloss measurements will be taken in order to quantify the appearance of natural resin films and of films that are top-coated with an acrylic barrier varnish. Electron photomicrographs will be used to illustrate the difference in surface characteristics between acrylic resin films, uncoated dammar films, and dammar coated with Acryloid B-72.

A practical methodology for the application of UV-barrier top coats to protect natural resin films on paintings will be discussed.

Early Italian Paintings: Varnishing and Aesthetics

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This paper will deal with not only the original appearances desired by early Italian painters for their works, but also with the impact of varnishing on the creation of the paintings' later appearances and aesthetics. I will investigate original intention and subsequent appearance by examining a number of surviving panel-paintings and contemporary textual evidence.

We can be quite certain that early Italian panel-paintings were intended to look dazzlingly bright. Rich, pure pigments in egg tempera, most notably vermilion and ultramarine, were combined with the solid metallic appearance of pristine gilded backgrounds, and were engraved, stippled, and tooled for added luxury. Unaltered contemporary manuscript illuminations attest to this taste. Were varnishes part of this medieval aesthetic? The limited evidence that survives suggests that, in general, they were not. It seems fairly clear that the gold leaf backgrounds were never intended to be varnished. Cennino's description of how tooled and stippled gold was meant to sparkle confirms this. Often the original desire for deep-coloured burnished gold and lighter reflective stippling has been reversed by subsequent varnishing. However, whether the painted surfaces were to be varnished remains less certain. Examples of never-varnished early Italian panels have been discovered. But a few also survive with early glair or oleo-resinous varnish layers. Cennino mentions the use of oil varnishes. Nevertheless, an overall consideration of medieval aesthetic tastes would cause us to question whether these varnishes were ever intended to be used on a regular basis.

Of course, we are well aware of the way these appearances have changed over time, bringing with them new tastes and expectations for less brilliant, more subdued works. Varnishes have often altered irrevocably the colour of azurite blue draperies. More generally, yellow or darkened varnish films have temporarily changed the chromatic values of early Italian panels. One of the results is shock when varnish layers are totally removed from these panels, as they often have been at the National Gallery in London. Still, my research suggests that the total cleaning approach is appropriate for early Italian works when a glimpse of the original intention is the aim.

Authenticity in the Application and Use of Varnishes in 17th-Century Italy

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The 17th century in Italy saw the co-existence of two contrasting schools of painting. The Naturalistic School followed the demands imposed by the Counter-Reformation and mirrored the new spirit of scientific enquiry into cause and effect in Nature (as pioneered by Leonardo and as practised by the Venetians and their followers). This was a type of painting that appealed to the senses and through the senses to the emotions. The second school of painting, unlike the Naturalistic School, derived its inspiration from Raphael and the Antique and appealed to reason and "the eye of the understanding". It was this latter type of painting that gave rise to the Academies and that stressed the place of painting as one of the liberal arts.

Current practices, in both the removal and the application of varnishes, take little account of the fundamental differences in the intent of artists from each of these two schools. These differences are documented in contemporary sources such as Malvasia, Baldinucci, Symonds, Pietro da Cortona, Armenini, etc., as well as in technical evidence from the paintings themselves.

It is suggested that the historical context of a work should be taken into account during varnish application and removal so as to compromise the intent of the artist as little as possible.

Attitudes to Varnish in 19th-Century France

Vojtech Jirat-Wasiutynski
Queen's University
Kingston, Ontario, Canada

The period c. 1800 was critical for the history of painting technique in France: the authority of continuous studio practice was being challenged by the desire to recreate past techniques. With the new explanatory power of history (historicism), authenticity and permanence emerged as significant categories in technical literature and in artists' writings. At the same time, two new professionals, the curator and the restorer, were charged with preserving the work of art and with presenting it to the public.

Certainly, there was dissatisfaction with oil painting and the perception that recent, as opposed to "Old Master", paintings were poorly preserved because of faulty technique. We should not, however, underestimate the profound effects of contemporary historicism. "Transparent" and "opaque" painting were distinguished as the two fundamental traditions of European painting, and both were revived. There was widespread interest in earlier art, often painted in media other than oil — such as tempera, fresco, and wax — and there was a desire to recreate these techniques in an historically accurate way. These historicizing interests existed in tension with a modern emphasis on artistic originality and individualism. Solutions for present technical problems were being sought in past art at the same time as original effects were being created experimentally. The use of varnish was a central issue in this historical and aesthetic debate. This paper will examine and interpret French attitudes to varnish as a surface coating at two periods: c. 1830 and c. 1880.

VARNISHES

Authenticity and Permanence

Colloquium Program

Monday, September 19, 1994

8:30 - 9:00 Registration

9:00 - 9:15 Opening Remarks
Charles Gruchy
Director General
Canadian Conservation Institute
Ottawa

Introduction
Leslie Carlyle
James Bourdeau
Conference Organisers

Session 1

Session Chair: Cliff McCawley
Director, Conservation
Research Services
Canadian Conservation Institute
Ottawa

9:15 - 10:30 "An Overview of Research on
Picture Varnishes" Part I
René de la Rie
Head of Scientific Research
National Gallery of Art
Washington

10:30 - 11:00 Refreshment Break

11:00 - 12:00 "An Overview of Research on
Picture Varnishes" Part II
René de la Rie
Head of Scientific Research
National Gallery of Art
Washington

12:00 - 1:30 Lunch

Session 2

Session Chair: Caroline Villers
Lecturer, Department of
Conservation and Technology
Courtauld Institute of Art
London

1:30 - 2:30 "Synthetic Resins as Surface Coatings"
Alan Phenix
Lecturer, Department of
Conservation and Technology
Courtauld Institute of Art
London

2:30 - 3:30 "Paraloid (Acryloid) B72 as a
Varnish for Paintings"
Stephen Hackney
Senior Conservator of Paintings
Tate Gallery
London

3:30 - 4:00 Refreshment Break

4:00 - 4:20 "When and With What to Varnish—
Some Practical Considerations"
Anne Ruggles
Paintings Conservator
National Gallery of Canada
Ottawa

4:20 - 5:00 "Aspects of Varnishing Historical and
Contemporary Paintings"
Marion Barclay
Senior Conservator of Paintings
and Contemporary Art
National Gallery of Canada
Ottawa

5:00 - 7:00 Wine and Cheese Reception

Tuesday, September 20, 1994

8:45 - 9:00 Opening Remarks

12:00 - 1:30 Lunch

Session 1

Session 2

Session Chair: **Robert Feller**
Director Emeritus
Carnegie Mellon Research Institute
Pittsburgh

Session Chair: **David McTavish**
Head of the Department of Art and
Director of the Agnes
Etherington Art Centre
Queen's University
Kingston

9:00 - 9:30 *"Some Examples of the Identification
of Natural Resin Varnish Components
in Paintings"*
Raymond White
Principal Scientific Officer
National Gallery
London

1:30 - 2:10 *"Early Italian Paintings: Varnishing
and Aesthetics"*
Cathleen Hoeniger
Assistant Professor
Queen's University
Kingston

9:30 - 10:00 *"The Mass Spectrometric Identification
of Natural Resins and Their Degradation
Products In and On Paintings"*
David Rainford
Former European Community
Post-Doctoral Associate
FOM Institute for Atomic and
Molecular Physics
Amsterdam

2:10 - 2:50 *"Authenticity in the Application
and Use of Varnishes in 17th-
Century Italy"*
Helen Glanville
Lecturer
MST Sorbonne
Paris

10:00 - 10:30 *"Reproducing Traditional Varnishes:
Problems in Representing Authentic
Surfaces for Oil Paintings"*
Leslie Carlyle
Paintings Conservator
Canadian Conservation Institute
Ottawa

2:50 - 3:30 *"Attitudes to Varnish in 19th-
Century France"*
Vojtech Jirat-Wasiutynski
Associate Professor
Queen's University
Kingston

3:30 - 4:00 Refreshment Break

10:30 - 11:00 Refreshment Break

Session 3

11:00 - 11:30 *"Yellowness and Removability: How
Much Change? How Fast?
How Important?"*
Stefan Michalski
Senior Conservation Scientist
Canadian Conservation Institute
Ottawa

4:00 - 5:00 Panel Discussion
Moderator: **Ian Hodkinson**
Professor and Program Director,
Master of Art Conservation
Program
Queen's University
Kingston

11:30 - 12:00 *"Using UV Absorbers in Acrylic
Top Coats as a Remedial Treatment
for Dammar Varnishes
Containing Irganox 565"*
James Bourdeau
Senior Assistant Conservator
Canadian Conservation Institute
Ottawa

5:00 Closing Remarks