Wash and Gouache

A Study of the Development of the Materials of Watercolor

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and watercolorists have gloried in their washes' "bloom . . . the fetish of the watercolor method of work, and its greatest beauty."[9]

As might be expected from the discussion of the varying properties of mineral and organic pigments, different pigments require different amounts of gum, in order to wash well and adhere to the paper. Two watercolor pigments no longer in use, Sap green and Gamboge,[10] were concentrates of natural vegetable juices and needed no gumming whatsoever.[11] Ultramarine, Brazil lake, and Bister, all also obsolete, required more gum than usual,[12] as did Carmine, an exceptionally beautiful and fugitive red which was heavily gummed in hopes of preventing its fading.[13] Other pigments, notably chromates, affect the gum; and dextrin, a weaker binder, may replace it.[14] Still others, such as Cobalt blue, that dry into exceptionally hard cakes, may require a more soluble additive such as sugar to permit their easy use.[15] Gumming was also varied according to the pigment's use, especially in miniature painting. Intense colors such as browns and blues, which were intended to bear out with force, might be heavily gummed, while the paler flesh tones ("lake, yellow ochre, and vermilion") would be lightly gummed to achieve a more delicate effect.[16]

These properties were discussed more completely in manuals of the eighteenth century and earlier, when the artist was required to gum his colors himself; but they had consequences in later years when artists worked with colormen's dry cakes, which are also manufactured with varying amounts of gum.

Dry-cake colors were invented by the colorman William Reeves c. 1780. They were accepted immediately, and Reeves was awarded "the Greater Silver Palette" by the Society of Arts' Committee on Chemistry "as a mark of approbation of their method of preparing pigments for painting in water colours."[17] Within only a few decades his invention was bracketed with Whatman's as the technical fulcrum on which the rise of English watercolor turned:

> Until [about thirty years ago] every artist was obliged to prepare his own colours: which, generally for want of sufficient knowledge of their chemical properties, and leisure to grind and prepare the pigments, gave much trouble, and produced but indifferent success. Indeed, so little understood was this necessary branch by the colourmen themselves, that not only were the worst colours prepared by them, but even these were . . . scarcely fit for use. Reeves' new process . . . at once removed this inconvenience. . . . Upon this invention others have made considerable improvements, until the preparation of water-colours has almost attained perfection.[18]

Gum arabic is incorporated into pigments during or after grinding in water. The paint is dried into cakes, but protective lyophilic colloids being what they are, the dried cake can be worked into a colloidal dispersion again and again.[19] Thus not only can the watercolorist wash up his color from the cakes, he can also wash up washes previously applied and dried on his paper, with a higher proportion of gum making a pigment more liable to washing up. This can be a serious hazard to the picture if washing is repeated over heavy, granular pigments such as Vermilion that require extra gum for proper adhesion to the paper. On the other hand, techniques have been evolved to turn this property to the artist's advantage.[20] But before discussing the refinements of the wash technique, the basic processes must be described.

WASHING

Dry watercolor paints are rubbed up with water before being diluted into a thin wash. With homemade pigments, the watercolorist worked around his shell with a wet, clean finger[1] or else an ivory spatula, if he did not want to waste even a grain of such expensive pigments as Ultramarine.[2] Dry cakes might also be rubbed up with the finger, to save wear on an expensive Large Swan,[3] but the brush is the usual tool.

The artist was advised against slopping water on the cake with the brush to soften it, as this action repeated will eventually harden the pigment,[4] presumably by washing out its lyophilic

binder. Instead, the cake was to be pre-moistened, either with a wetting agent such as ox-gall[5] or with the breath followed by a few drops of water, applied by the truly fastidious with a pipette.[6] One author recommended dipping the cake in water;[7] another objected: "do not, on any account, dip the cake of colours into the water, for by that means the edges become softened, and crumble. . . ."[8] Even the simple operation of dissolving his color rouses the watercolorist to factionalism. If a quantity of wash is needed, the moistened cake is rubbed on a saucer to the consistency of cream. The colored paste is then diluted and decanted,[9] or the wash might be mixed in a paper funnel, which would trap sediment at its tip.[10]

His washing water readied, the artist sets the prepared paper before him at a slight inclination. With his largest brush full of dilute color, he begins at the top drawing the brush horizontally across the sheet, refilling the brush and repeating the operation below each prior stroke, "methodically advancing a pool of liquid color across the surface of the paper"[11] until the desired area is filled. The tilt of the board causes excess wash to follow the brush; if the angle were inclined more toward the vertical, as is customary for oil painting, the liquid would, of course, simply drool to the bottom of the sheet.[12]

The color can be gradated in the process of washing by adding pure water to the brush at each stroke; conversely the wash can be intensified by beginning with pure water and continuing with additions of color. A combination of perfectly gradated washes may be admired in Pissarro's *Landscape, Eragny* (49), where the artist apparently stood his sheet on its side, laid a gradating blue wash in the sky and then, reversing the sheet, laid a gradating yellow wash over the blue,[13] to depict the golden side-light of an autumn afternoon mellowing an azure sky.

Overlaying of transparent washes naturally became a great specialty of the watercolorist: Kandinsky has used a simple two-wash system with broad noncoincident areas as the central motif in his *Landscape* (30); the shaft of Hopper's lighthouse (25) is a more complex example.

Advocates of pure wash urged self-discipline on their pupils, for such transparent overlays require that the first layer be virtually dry before reworking: "Be patient, and let your first tint dry before you touch it again. . . . you only flurry yourself by dashing at nothing."[14] Others recommended everything from paper bonfires[15] to electric hairdryers[16] to speed the process. Of equal concern were the pigments used, as some tend to wash up more readily than others. Indian red, reputed to dry particularly hard on the sheet,[17] was a common ingredient of preliminary mixed-gray tints, whereas Vermilion, though useful for final touches, was a virtual pariah on the washer's palette.

The wash method as described is generally suitable only for covering large areas. If the shape of a smaller form may be relatively sketchy, its wash, too, can be laid in boldly; for its "colour looks much more lovely when it has been laid on with a dash of the brush, and left to dry in its own way."[18] Yet as Ruskin went

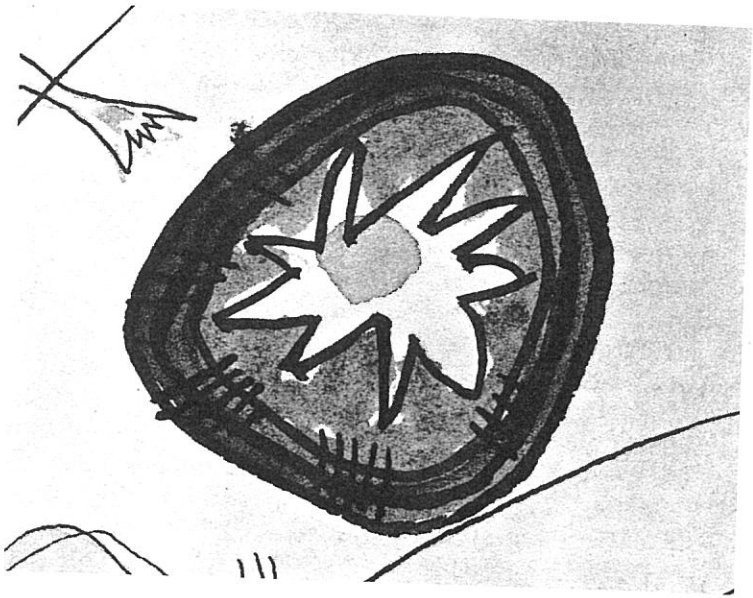

FIG. 10. Vasily Kandinsky, *Landscape* (30, detail 200% actual size).

on to admit, its edges as well as its form would "be a *little* wrong," for if a wash does not cover the sheet and its edges are left on view, it will evaporate on dry paper with a visible concentration of pigment and binder at its edges. The effect results from the constant motion of the particles within the wash against the barrier of its edges and the tendency of the wash's edges to dry much more rapidly than its interior area. The bane of watercolorists interested in aerial effects, it led to the development of wet-sheet washing techniques and to the reworking of edges by "softening off," that is, by "extending the colours by touching upon its edge, with the pencil and water only. . . ."[19]

Other artists appreciated hard edges, some as a sort of badge of the brilliancy of their wash style: "Be careful to leave the *edges* of the tints undisturbed, as this gives *air*, and prevents the sketch from looking like a coloured print. . . . the raw edge is the very thing that gives spirit to the drawing."[20] Some watercolorists have used their washes' edges as lines as well as boundaries.[21] Kandinsky's spot of rose wash, the floating center of a concentrically ringed sun above his *Landscape* (30, fig. 10), dried hard-edged in pink strong enough to read as a "drawn" circle even though it is surrounded by the visual clamor of black-jagged ink lines and bright-colored rings.

Hard edges can be put to more representational use in shadows washed in freely. As the manual writers observed, "The darkest parts of shadows are near their edges, the middle being lighted by reflected lights."[22] Thus Shinn's blue washes on his white paper (57) perfectly convey the luminescence of shadowed fresh snow and the sharpness of its boundary with sunshine.

Pissaro has exploited the effect even more subtly. Wishing to place a fence in the distant middleground of his *Landscape, Eragny* (49) that would not interrupt the softness of his passage with drawn forms, he dotted in a series of wet rose puddles. In drying, their minute hard edges formed the outlines of the fence pickets, yet their transparent centers allow the shimmering greens beyond to shine through as clearly as before.

Exact, intricately shaped washes were executed in another manner:

> with a large *Pensill*, wash over carefully the whole ground, that you mean to cover with somewhat a thin and waterish *blew*; and after with a reasonable great *Pensill* full of Colour and flowings, lay over that very place, with thick and substantial Colour. . . . In doing of this, be very swift, keeping your *Colour* moyst. . . . the watering over the *Card* before with a thinn *Colour* makes the rest, that you lay after, to settle even and handsome, which otherwise would lye in heaps, like unto drift *sand*.[23]

The quick and uniform blending of color into relatively pure water (a perfect example of the pigment assuming colloidal dispersion) was but a first step toward the observation that colors could be blended together wet on the paper rather than applied as transparent layers—and that hard edges could be prevented from forming by this process. Watercolorists at the turn of the nineteenth century, only newly accustomed to the use of pure color in direct washes, approached the wet-into-wet method cautiously. David Cox in his manual of 1813 stipulated overlaying washes in every case except in that one moment when nature itself blends colored light: ". . . when [the sky washes are] perfectly dry, colour the extremity of the rainbow with red; then soften it with yellow, which will produce an intermediate tint of orange. While the yellow is wet, run in a blue, which will give a green. . . ."[24]

Within forty years Penley would write, "It is advisable to run the first colours one into another, without any reference to form. . . . This is termed blotting in, and consists of so many indications of colour only."[25] Later recommendations for wet versus dry methods would often depend upon the criterion of subject, much as paper texture had been decided upon for generations: "methods of work may be roughly divided into two great classes—the dry and the wet. . . . Flower painting will be dealt with according to the dry paper method, while for Landscapes and Marines a wetter system of work will be explained, Figures, Animals, and Still Life being painted in a combination of the two."[26] A clear realization of the difference in effect between the two methods, especially in the appearance of washes'

edges, is found in Hassam's sky (21), where a wet-blended blue stroke was followed by another blue stroke applied just below after the sheet was virtually dry.

Artists became concerned with methods to retard drying. The elaborate systems of wet paper preparation have already been mentioned, and a steaming tea-kettle could always be pressed into service.[27] The wet method was pursued so passionately that it made a positive virtue out of what would seem unendurable hardship: "Artists sometimes work out in the open when it is so cold that the colour freezes on the paper. This has been turned to advantage as, when the drawing has been brought into a warmer temperature, the ice melts, the edges soften, and the colour can be manipulated into charming effects."[28]

Though most watercolorists have lacked this dedication, many have observed and exploited the eccentric blendings of colors bled into each other wet. "An exceedingly watery tint added to one nearly dry comes out one way; a bit of thick pigment touched to a wash just floated in comes out another way; and two tints combined of the same . . . strength in still another way."[29] The colors "spread gradually in a branchy way"[30] as a result of currents set up at the conjunction of two colors in a relatively liquid medium, caused by differences in their specific gravity or the energy potential of the solutions, or by the interdiffusion by capillary action of colors in a relatively damp medium across the moistened sheet.

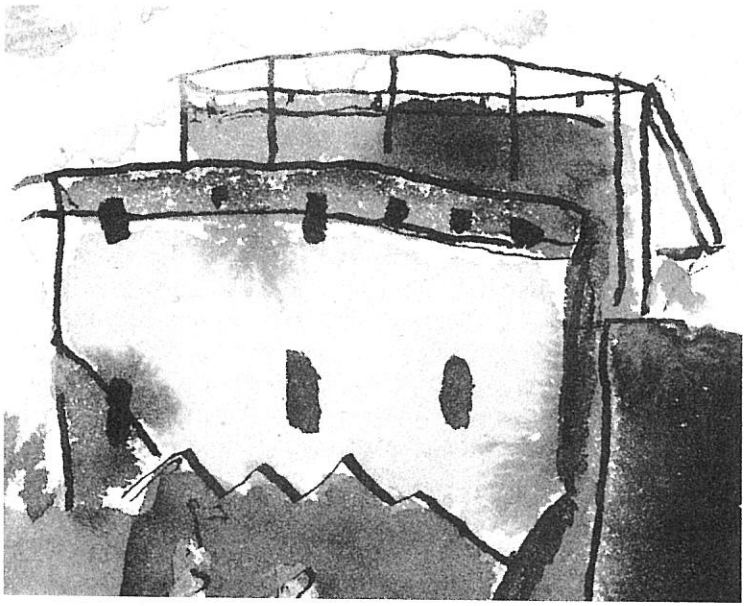

FIG. 11. Arthur Dove, *Gas Tank and Building 38* (17, detail actual size).

The painter may capitalize upon happy accidents; the "branchy" diffusion of gray into tan where two soaking washes touched in Arthur Dove's *Gas Tank* (17, fig. 11) was meticulously imitated in radiating brush strokes in his oil painting of the same subject. A watercolorist may even attempt to foster such accidents through his method, although very few are capable of Homer's control of wet-into-wet blending seen in *Key West* (24, fig. 8). Striations of the free diffusion of a darker splash of blue into his pale wash perfectly represent the shimmering, rayed, refracted shadows that hang under sloops bobbing on a pellucid tropic sea.

An artist such as Calder, whose impetuous draughtsmanship heeds neither the deliberation demanded by overlapping transparent washes nor the anticipation required to achieve exact hues by wet-into-wet blending, may still benefit from properties of both techniques. In the belly of Calder's hippopotamus (10, fig. 4) drawn first in blue and then washed over in red, the hard edges of the blue strokes had dried just firmly enough so that when the red swept away their liquid centers, linear definition remained within the now-blended pool of rose and lavender. All seems accidental—that the first strokes' edges hardened just in the span of time required to finish the form in blue and begin again in red, that the red and blue could combine in exactly the volume and strength required to round out the hippo's belly—but the artist's sleight of hand was surely informed enough and responsive to catch each effect as it materialized and to capitalize upon it in the final (if not finished) form.

Methods of washing and color blending focussed the artist's attention on color effects, especially as the properties of watercolors seemed to embody in practice theories about color and light which rode at the forefront of contemporary science in the late eighteenth century. The very transparency of eighteenth-century organic watercolor pigments in particular stimulated an awareness of the subtlest aspects of color, for a transparent pigment on white paper will assume its hue more from the color of light transmitted *through* it, reflecting off the white paper and back to the eye, than from the light reflected *off* of it.

Yet if enough pigment grains, however transparent, are piled together they become opaque in much the same manner as a snow drift is opaque although its constituent parts, ice crystals, are perfectly transparent.[1] The hue of many pigments differs when seen by transmitted or reflected light, much as metallic gold, yellow in ordinary circumstances (opaque/reflected), appears green when beaten into thin leaf and viewed against the light (transparent/transmitted). Thus Alizarin, a popular pigment that is the essential coloring substance of the traditional Madder, is scarlet when painted thickly but more bluish when drawn thin.[2]

But complexities of individual pigments, though of peculiar concern to watercolorists, pale before the problems of pigment combination. Artists quickly gain a rough working knowledge of the deadening effect of mixing colors. No pigments are absolutely pure in the spectral sense; all reflect and/or transmit a certain fraction of other hues together with their dominant color. Mixing them may intensify their secondary color "noise" at the expense of the intended harmony of dominants: the mixture will be, in artists' terms, "muddy" or "dirty." Some mixtures will be "cleaner" than others. Some manual writers took pains to indicate which mixtures are relatively satisfactory and which are not: "ultramarine and crimson lake, Antwerp blue and gamboge, . . . scarlet lake and burnt sienna will be clean, cobalt and gamboge, Antwerp and chrome, . . . light red and raw umber will tend to be 'dirty.'"[3]

With the constant multiplication of patent colors concocted by artists' suppliers to attract the jaded eye, the manual writers also warned against concealed mixed pigments: "Some of the colours in the makers' lists are a combination of others, and it is often better to hold them separately. Cyanine, or Leitch's Blue, is a mixture of Cobalt and Prussian Blue . . . [etc.]."[4] The artist, conscientiously mixing only pure pigments himself, could be undone by the ambitious colorman.

It was thus of great interest to watercolorists that color mixtures retain their purity better and give a more intensely colored, livelier hue when washed on in separate transparent layers or wet-blended individually onto the sheet rather than pre-mixed on the palette. Light reflected from the paper through layers of washy colors or through the intermingled washy currents of pure hues seems to retain the depth and vitality of its components, which are blended by the eye into a new hue. There quickly arose an enormous literature on the proper sequence and balance of pigment applications for the best results.

Practical manual writers considered pigments' handling characteristics as well as their final effects: "The general rule, that a much purer compound hue may be produced by passing one tint of different chemical character over another than by applying them mixed together holds true with more force in water-colour painting than in oil. In such operations, however, as the earthy and mineral colours will not bear friction, they must be applied last."[5] Artists in the earlier years of the nineteenth century were particularly concerned to balance warm and cool hues, with conflicting theories on the proper washing sequence.[6] In the later years, particularly after the widespread publication of Chevreul's color theories, they turned to systems of complementary colors.

Thus Turner's *Bally-Burgh Ness* (60), for example, opposes two cool pigments, an opaque and a transparent blue, to two warm ones, an opaque and a transparent red, with a gloss of the third primary color, yellow, to complete his spectrum. Nolde's

watercolor (47), though it presents a full-color image in its completed form, was in fact executed in complementary color systems. The pigments were laid on heavily enough to allow us to ascertain their sequence: over a black brush underdrawing the artist first laid blue. He allowed it to dry and then complemented it with yellow and orange run together. Next he added a second set of complements, rose and green, to complete the painting. Pissarro, likewise working in the full spectral range over his entire sheet (49), set up systems of complementaries within it: below his yellow/blue sky lies a rose/green vista.

Pissarro in particular was concerned with vitalizing compound colors. At the moment of his radiant watercolor, whose effect depends upon layer after layer of the purest hue, he was also experimenting with multiple-plate color etchings using intensely pigmented, transparent inks.[7] He criticized his contemporary Mary Cassatt, who was also printing in colors: "she does not use pure colors. . . . The drawback is that she cannot obtain pure and luminous tones . . . ,"[8] and he earlier asserted that his intention in oil painting was: "To substitute optical mixture for the mixture of pigments."[9] This had, of course, been the working premise of watercolor artists for generations.

Two mixed colors were watercolorists' particular concern. The washing tradition had begun with the practices of the topographic landscape artists, who laid in local tints over a wash drawing in "dead Colours,"[10] that is, in black diluted to varying grays, which established the tonal values of the painting, as in Rowlandson's *Mail Coach* (52). The first advance upon this method was made in the later eighteenth century through the

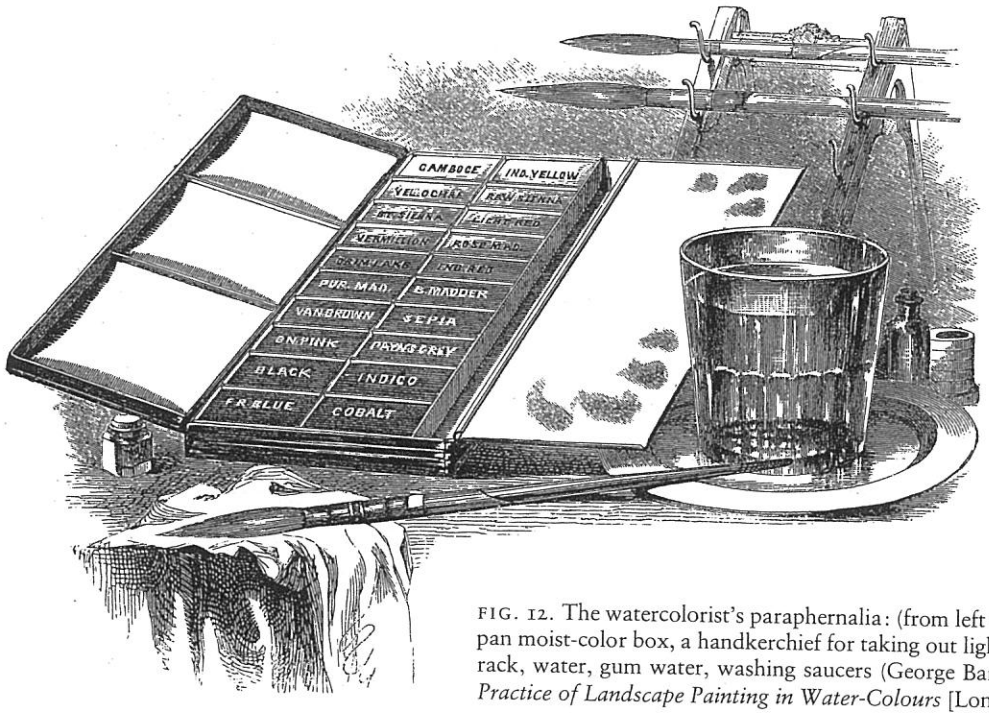

FIG. 12. The watercolorist's paraphernalia: (from left to right) Chinese white, pan moist-color box, a handkerchief for taking out lights, quill brushes, brush rack, water, gum water, washing saucers (George Barnard, *The Theory and Practice of Landscape Painting in Water-Colours* [London, 1858], p. 49).

development of "neutral tint," a "broken"[11] gray that the artist could mix himself or purchase ready-made. Although a mixture, neutral tint was perceived to have less of a deadening effect on superimposed washes than black: "black will occasion the other colors, when laid over . . . to look dingy and opaque; but if they be laid over neutral tint, they will retain their original colors."[12] The effect of neutral tint may be appreciated in an anachronistic example in *The Schelde at Antwerp* (1), where the reds and blues of foreground tints have been run together in the distance to make a warm gray.

Neutral tint was compounded from various red and blue pigments, sometimes with a small admixture of black retained to give depth. Pigments that are not susceptible to washing up[13] and are therefore suitable for under-washing were favored: Light red, Indian red, or Madder lakes; Indigo; a touch of Ivory black.[14]

The prevalent use of neutral tint (the obstinate Blake remained faithful to Indian ink [4])[15] has had unfortunate consequences. The pigments, especially Indigo and some Lakes, are notoriously fugitive. As early as 1820 Nicholson commented,

> The great beauty of this tint [a mixture of Indigo, Lake, and an unspecified yellow] . . . tempted many. . . . if works in which it has been used be kept from the light . . . they may remain a considerable time, but if they be exposed to the action of light . . . the pearly greys become by the flying of the lake of a dirty greenish hue.[16]

A great early advocate for permanent watercolors, Nicholson advised the substitution of Indian red for the fugitive Lake, but he retained Indigo. Although it is the only traditional blue not susceptible to washing-up, it is also light-sensitive, so that after some years of exposure watercolors employing this formula "become hot and 'foxed.'"[17]

In the last years of the eighteenth century, perhaps under the impulse to work in purer colors, artists separated neutral tint into its component warm and cool hues.[18] Shading was accomplished in the skies with various blues, perhaps touched with red, and in the landscapes with browns and yellows, shaded with blues, which presented a new mixing problem. As artists worked more and more directly in color without the support of gray for tonal depth, they were forced to face the puzzle of another sort of neutral tint: green.

Some theories of the operation of colors assign to green a position of neutrality between advancing/high/hot orange-yellow and recessive/low/cool blue-purple.[19] Its ambiguous placement between the fashionable conceptual opposition of warm and cool colors would have been sufficient to engage the early nineteenth-century watercolorist, but added to this theoretical perplexity was the very practical problem of green pigments.

Through a combination of circumstances, pure green pigments in use in oil painting and even those used by earlier watercolorists were unacceptable when stable greens of full range were required. Virtually all that were available until the mid-nineteenth century were fugitive and/or excessively transparent (Iris green, Sap green), acid and thus destructive to paper (Copper green, a variant of Verdigris), or poisonous (Scheele's green).[20]

The watercolorist was, therefore, forced to mix green from blue and yellow; and the components of this mixture, their application to paper, and their predominance in the final image became the subject of endless controversy. Even after reliable pure green pigments became available with improvements in Chrome greens at mid-century, recommended palettes continued to exclude them (see fig. 12), and mixed greens were preferred. In 1887 a color chemist insisted that "No mixture of blue and yellow pigments will afford a green so beautiful and stable [as Viridian, a transparent hydrated oxide of chromium]."[21] Yet decades later a watercolorist referred to not one but three combinations of blue and yellow pigments, to establish aerial perspective through relative coolness or warmth: Cobalt blue and Yellow ochre for the distance, French blue and Gamboge in the middleground, and Indigo and "a brighter yellow" in the foreground.[22] In 1968, after Phthalocyanine green[23]—a completely satisfactory pigment in watercolor and acrylic techniques

—had been available for thirty years, an artist working in both media in the wash style reported, "I carry no prepared greens. My greens are all mixtures of yellows and blues."[24]

Various theories have been advanced for the watercolorist's persistent interest in mixing his own greens or his avoidance of the color entirely, even as a mixed tint. Some have claimed that the apparent lack of green in many artists' work, notably Turner's,[25] is the falsification of time, which has faded original mixtures of Indigo and Gamboge. There is no doubt that pigments used to mix green in the early nineteenth century, like those used for neutral tint, were fugitive. Indigo was a common component, as was Gamboge, a somewhat fugitive yellow.

The problem of fading was approached by Field in 1835 with his usual perceptiveness: as the artist's conception would suffer more in posterity's eyes if its balance altered rather than if it simply became paler, Field recommended that the components of mixed greens should have "the same degree of durability; and in these respects Prussian or Antwerp [a variety of Prussian] blue and gamboge form a judicious, though not extremely durable, compound. . . ."[26] More recent opinion attributes a greater permanency to Prussian blue than Gamboge, and there is no doubt that many nineteenth-century landscape watercolors whose foliage is now definitely bluish have lost their yellow washes.[27]

Given Turner's obvious fondness for primary colors and the diatribes against relatively pure greens found in nineteenth-century manuals, it seems likely that many artists simply avoided the perplexities of both the pure color and its mixing by accentuating its warm and cool components. Their dislike of green may have been based in the late eighteenth-century attempts to ally watercolor landscape painting with the great tradition (and the golden patina) of oil painting of the past; Claude was their particular hero. It has been suggested that as nothing was commoner coin of the natural realm in England than green, how could the color be precious enough for fine art? An eighteenth-century watercolorist's outburst against green supports the thesis: "nothing can have a more common or vulgar air, than too much green."[28]

By the nineteenth century utter condemnation replaced disdain:

> The general tone of a picture may be yellow, red, blue, grey, or brown [in other words, any of the primary colors or their complete combination]; but a green picture, however true to Nature, becomes utterly disagreeable, and even if a green picture has been admired, it has been, not in consequence, but in spite of its being green.[29]

This author's bias against the use of green, then a predominant color in controversial Pre-Raphaelite landscapes in opaque watercolor and oil, and his ill-digested understanding of developing concepts of optical effects persuaded him to attribute to nature itself the restricted properties of the watercolor palette:

> The yellow tinge given to the atmosphere by the sun's rays does not turn, as might be expected, its blue tints into green, because the pearly grey still left in the shadows, untouched by the yellow light, interposes a neutral tint, which from its opacity prevents the mingling of the colours.[30]

And so artists frequently attempted to maintain a very broken color in their washy "broken" greens, by allowing overlapping or wet-blended blues and yellows to mix so coarsely in the eye that they appear mottled into their constituents: "To paint in yellow and then run your blues into it when wet to get green . . . often gives beautiful and varied effects."[31] There is no doubt that many of the greens in the present exhibition, particularly those in earlier transparent wash paintings, are mixed colors. In Blake's *Lucia Carrying Dante in His Sleep* (6) rich edges of blue and yellow, Blake's embodiment of nature's "spots" that "are its beauties," are visible at the near ground of the grassy plateau toward which the figures move.

On the other hand, there are in fact very few greens in the early watercolors on view. Only gradually does the use of green become prominent, in such paintings of the natural world as those by La Farge (33, 34), Pissarro (49), and Hassam (21)—and it is never common.

Techniques of "softening off," wet-sheet washing, and wet-blending led the watercolorist to reduce the intensity of washes by rewashing and manipulating the colors of his sheet. The soaked pigments would be driven into the paper grain and the depth of tone reduced on the nubs of the sheet to "improve the aerial tints, and leave a beautiful granulation upon the surface of the paper."[1] This produced the visual equivalent, but with softened rather than sparkling lights, of the effect obtained when direct wash on dry paper is "used thicker and with less in the pencil, [dragging] upon the prominences, touching these only, and leaving the intermediate parts lighter."[2]

Simple resoaking in water could reduce washes,[3] but more often the artist used at least a brush to push the color about, and often he employed more vigorous methods. A brush could be a more vigorous tool than in its usual delicate application in washing. A manual writer advised: "When any of these first tints prove too heavy, and cannot be sufficiently removed by repeated washing, it will be necessary . . . by passing large quantities of water on the drawing, and applying a rather stiff brush, against the hair, to loosen the colour, and thus remove it."[4] Though this may seem strenuous, the beginning painter was elsewhere assured that "rubbing . . . and tinting may be repeated as often as may be requisite or as the paper can bear, which will be much more often than the learner can be aware of."[5]

Studying closely the deeper tones of Turner's *Simplon Pass* (61, pl. 6), one sees that countless broken brush bristles are imbedded in the pigment. Turner must have practically worn out a brush against what seems a relatively thin sheet, yet there is no apparent damage to the paper fibers whatsoever. Turner was notorious even in his youth for complicated techniques of wash reduction; he "soaked, blistered, daubed, rubbed, and scratched with his thumb nail, until at length beauty and order broke from chaos."[6] His technical innovations became conventional within twenty years.

The brush was often relinquished for other tools, which also

FIG. 13. Eugène Lami, *Duke and Duchess of Brabant* (35, detail actual si

absorbed and/or rubbed away excess color from the paper. The gentlest method was certainly simple blotting: "If it be considered desirable to increase the granulated appearance, place a sheet of absorbent white paper over the surface immediately after the tint has been washed with water, pressing equally upon it in all parts. . . ."[7] After blotting, the color could be further reduced "by gently rubbing the part with bread-crumbs or India rubber";[8] the artist was warned not to press hard lest the paper become greasy and refuse subsequent washes.[9] The means most frequently recommended was sponging: "It is difficult to exaggerate the value of the sponge. . . . The reason . . . may be found in its texture and nature. It is covered with a short fine pile, the hairs of which enter the hollows of the paper and gently disengage the colour, which is then drawn up with the sponge."[10]

If the handling characteristics of specific pigments were respected, methods of combined wet abrasion and absorption could produce an effect comparable to that made by the direct washing of sedimenting pigments that is seen in Hassam's *White Mountains* (21, fig. 9). In Lami's portrait (31, fig. 13) the assemblage of accessories at the right provides a transition from blank paper to the firmly painted figures. At the extremity of the design a column and drape are lightly washed in transparent, muted tones, but as the fabric falls closer to the central subject it becomes more complicated in its painted structure. A layer of gray underwashing was covered with Vermilion, an opaque red pigment susceptible to washing up. The area was then remoistened and carefully blotted to model the fabric's folds and shadows in residues of granular red over gray. Transparency and opacity are suggested simultaneously, creating a bridge from the emptiness at the right to the palpable figures in the center.

A wash could be further reduced with a greater contrast between the lightened top grain of the paper and its tinted pores, though with no color differentiation, by rubbing with pumice or fine sandpaper, "one of the most successful means by which atmosphere is given to dark and shadowed skies. . . . The sandpaper must be that known as number 0, and . . . two pieces should be well rubbed together before being used."[11] The delicate points of light illuminating the "dark and shadowed skies" in Varley's *Harlech Castle* (62) were certainly effected by the use of fine sandpaper.

Sandpaper damaged a sheet's surface sizing more than other reworking and lightening techniques. Accordingly it was recommended especially when further washes were contemplated, as they would "flow on most agreeably and be free from hard edges." Indeed, sandpapering could be substituted for preliminary moistening to break down the sizing on very large sheets that would otherwise dry out irregularly before the artist could cover their entire surface with wash.[12]

All reductive techniques applied at large could also be adapted in small. For artists interested in emulating the effects of oil painting, one approach would certainly be to imitate the traditional working sequence in oil painting of developing light accents on a darker underpainting. For the artist working in the transparent manner, the abrasive reduction of washes and the creation of highlights by color subtraction were considered the only means "by which a papery appearance is entirely done away."[13]

Previously, in the earlier eighteenth century, watercolorists had formed their highest lights by carefully reserving blank or thinly washed paper in those areas that they wanted to have remain relatively light in the finished image. This complicated the problem of laying uniform washes, as washes are most successful when painted broadly without conscious attempts to preserve interior highlights. The expedient of opaque white laid over wash was abhorrent in its compromise of the transparency of pure watercolor. And so the wash artist could either sketch broadly in the manner of Constable (12, fig. 2), leaving relatively unformed highlights;[14] or he could draw precise patches of wash set off by white, to some extent the manner of Demuth (16, pl. 3);[15] or he could simply accumulate small, colored touches in Blake's (4, pl. 1) and Isabey's (29) method until the entire sheet was modulated from light to dark. In all these techniques, "a papery appearance" is very much in evidence in the finished works.

FIG. 14. John Singer Sargent, *The Man Reading* (55, detail actual size).

Reductive techniques became the rule in highlight details among early nineteenth-century artists attempting to elevate the status of watercolor from drawing to painting, and Turner led the way. In 1802 it was reported that his style was "to rub, sponge, and wash off lights,"[16] methods which can be seen in his works on view (60, fig. 16; 61, pl. 6).

Two wet methods were advised. In the more traditional one,[17] while the entire area was damp the artist would draw the desired lights with a pointed absorptive tool such as a barely damp brush or a bit of sponge in a crayon-holder, picking up the color from the picture.[18] If the paint medium was made somewhat viscous, by the addition of extra gum for example, the color could simply be pushed aside by a smooth, hard point rather than absorbed from the sheet. Turner, who is believed to have added extra gum "to give his medium more of the plastic quality associated with oil color,"[19] has used this method to delineate a road winding down the left wall of the *Simplon Pass* (61). A creamy ridge of pigment remains along the track, thrown up by the artist's brush handle or, perhaps, his thumb nail. Appropriately, one modern artist removing acrylic paint, which can be mixed to a similar viscous consistency, uses a plastic credit card instead of his brush handle or finger tip.[20]

The other wet method recommended for creating highlights was to lift them out by locally redissolving the color. The artist would draw on the dry painting with a finely pointed brush the exact form of his intended highlight in pure water, to which sugar[21] or gum could be added to increase the solvent action of the water.[22] After waiting a bit—"You will know [the moment] by seeing the colour swell up a little and appear moist but no longer wet"[23]—he would wipe the area smartly with a handkerchief or piece of soft leather. "Should either of these fail, place the water on again, and then apply . . . blotting paper and rub with bread."[24] The method could also be used when the painting was still slightly moist, but the paper could not be safely rubbed very strenuously and the highlight would be softer.

Sargent's *Man Reading* (55, fig. 14), a compendium of methods of washing and highlighting, shows the use of the locally

wet take-out in the bluish reflected light along the heel of the subject's hand, taken out while the sheet was still moist and thus not a "clean" wipe. Its soft luminosity may be compared to the sparkling highlight on the forefinger, a pale, papery reserve left in the washes that model the hand. A sharper-edged wet take-out forms the bright corner of the pillow visible in the crook of the subject's elbow.

Dry removal of color for highlighting could be accomplished with bits of sandpaper, which was thought especially effective to modulate light on architectural subjects,[25] or with cuttlebone;[26] but the abrasive tools more commonly recommended were knives and scrapers. The penknife could be stroked delicately to catch just the topmost paper fibers and produce an effect much like that given by sandpaper; this technique was probably used by Daumier to model the pail and apron in his *Butcher* (15). More often, however, the knife and scraper were recommended when bright white highlights were wanted, as their blades cut sharply through the paper itself, leaving no residue of color in the grain.

Scrapers—small, double-edged, triangular points set in handles (fig. 15)—are more suitable for the finest effects, such as the scratched-out spray breaking over the rocks in Turner's minutely worked *Bally-Burgh Ness* (60, fig. 16). As a scraper still survives among Sargent's painting equipment preserved at the Fogg, we may, perhaps, assume that it was used to flick the scratched-out lines into the pillow in his *Man Reading* (55).

Often highlights would be taken out before a picture was completed. Though tinted by subsequent washes, they would remain paler than the surrounding areas. Turner wet-lifted the light forms of the sun and its reflection from his *Bally-Burgh Ness* and then glazed the reflection with yellow to contrast it to its brighter source. Manuals traditionally recommended against the use of the knife or scraper in an unfinished painting, since they cut away the sizing and thus could cause glazes to blot.[27] But artists, particularly bravura technicians in the sketch style, were never restricted by this supposed limitation.

All three paintings by Winslow Homer in this exhibition

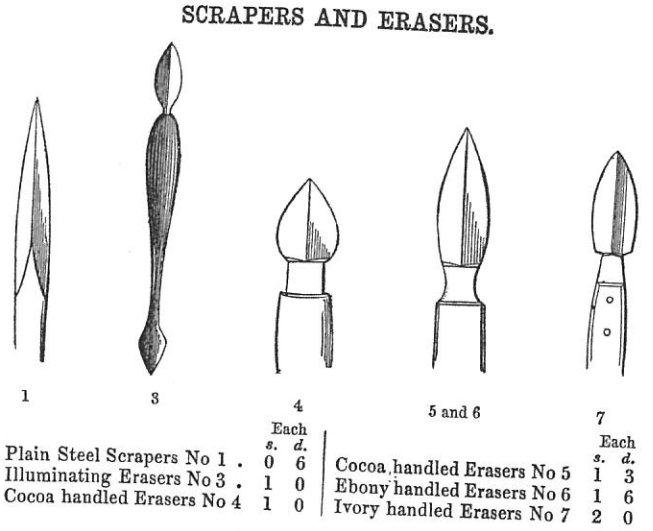

FIG. 15. Scrapers and erasers (*Winsor & Newton's List of Water Colors*, p. 41, bound in Aaron Penley, *The Elements of Perspective*, [London, 1866]).

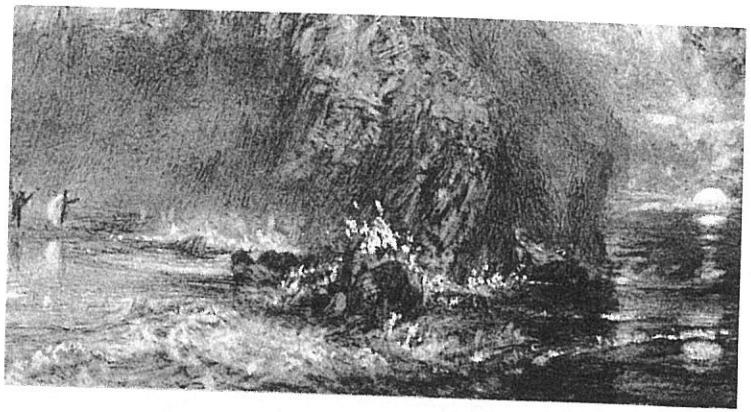

FIG. 16. Joseph Mallord William Turner, *Bally-Burgh Ness, "The Antiquary"* (60, detail actual size).

make extensive use of scraped highlights. Precise cuts form glittering lights in *Fourth of July Fireworks* (22); delicate scratches draw arcs of dead pine branches in *Hunter in the Adirondacks* (23, pl. 5); the boldest strokes make reflections in the damp washes of *Key West*'s sea (24, fig. 7). In each painting many of the scrapes were repainted, as the artist judged and altered his work in progress. In *Hunter in the Adirondacks*, for example, the paper was torn away to form the highlight on the log at the left, but a similar scrubbed-down area on the log to the right was repainted in intense red-brown.

And in *Key West*, observing that several scraped reflections encroached upon the effect of his wet-into-wet blended blue shadow, Homer carefully touched their left extremities with a blue dry enough so that it did not blot in the roughened paper but matched perfectly the washy tint of the sea. Considering the differences that wet and dry-brushed pigments show in drying, taken together with the uncertain absorption of scraped paper, these brief touches are the virtuoso coda of an astonishing technical performance.

Thus far wash-reduction and take-out methods using only the conventional materials of transparent watercolor have been discussed. But from the beginning of the nineteenth century artists sought out devices to approximate ever more closely the effects of highlights on oil painting. A method developed by John Varley about 1836 stands closest, perhaps, to conventional scratch-out techniques. He laminated thin brown paper to a white sheet, in a sandwich similar to printers' laid-china proof paper. Working his dark tones on the brown surface, he scraped through to the supporting sheet for white highlights,[28] creating a full range of values comparable to oil painting in intensity and tint.

The late eighteenth-century invention of masking agents was saluted by Ackermann in 1813 specifically because of its approximation of oil: "the effect produced by its means, is similar to that of glazing in oil, and so powerful is its extent, that copies of oil paintings have been made in watercolours, which vie with the originals in force of colour and brilliancy of effect."[29]

Masking agents can be as simple as pieces of paper clipped to shape and pasted into place, to be removed after the washes have been laid in, leaving white reserves in their place. Turner and Cotman are reputed to have used this expedient.[30] Ackermann referred specifically, however, to a process invented by Francis Nicholson and first published in the 1799 transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce: the artist mixes "whitened bees' wax in oil of turpentine, to which may be added as much flake-white as will give sufficient body to appear opaque when the touches made with it on the paper are held between the eye and the light."[31] The artist then commences his washes, stopping out lights at each layer much as an etcher stops out lines he wishes to have remain lightly bitten in his plate prior to reimmersing it in acid. Nicholson continues: "when the whole of the water colours are dry, with a hog's hair brush and oil of turpentine wash away the composition; as it dissolves wipe it off with a rag. . . . this will not affect the colours, because those used with gum water are not soluble in oil of turpentine."[32]

Although Nicholson successfully sued to retain his rights to this invention, others claimed it or proposed their own mixtures. In France Merimée concocted a paint of Lead white, Cobalt blue, and oil of turpentine, thickened by evaporation into a sticky paste. Laid on the watercolor paper, dried, and washed over delicately, it could then be removed with day-old bread to produce highlights.[33] Other masking agents, usually having a gum-resin or lac base and soluble in turpentine or alcohol, were patented through the nineteenth century.[34] None seems to have been widely used, however; "the complexity of the process was doubtless the cause of its failure. . . ."[35]

In the twentieth century new rubber-based masking agents were developed that combine the resistance to washing of Nicholson's film and the easy removal of Merimée's paste. Among the mixtures intended especially for use by watercolorists, Maskoid,™ introduced in 1939,[36] a fluid that dries to a rubbery film, is perhaps the best known in the United States. Common rubber cement and masking tape are equally expedient,

however, and widely used. Wax and oil crayons that repel washes may also be used as masking agents.[37] They have proved a favorite means of Henry Moore, the English sculptor whose drawings are frequently executed in watercolor washes.

Another masking device which was fully reported in manuals by the end of the nineteenth century is the stencil, which can be used to make both positive and negative images. In a landscape watercolor, for example, the horizon line with projecting silhouettes for buildings and trees can be cut out of stiff card and laid over the bottom of a watercolor sheet to permit a broadly washed sky;[38] or a stencil from which desired light forms have been cut can be laid over a completed wash, and the lights sponged out through the holes. One author cautioned against water seeping under the stencil's edge,[39] but the method has been used with success by at least one noted artist:

> One of Mr. [George] Grosz's interesting tricks is to cut little stencils of various forms, particularly grass forms, out of old photo film. He then lays this stencil over the water color, rubbing over it with a sponge. This picks up the color and the result is a beautiful clean and light blade of grass in a dark area.[40]

Stencils were suggested in particular to permit local corrections in watercolors, "so as not to disturb surrounding washes."[41] Errors and their corrections were a constant problem in the medium, although methods of scraping and reglazing were employed for corrections as well as for the creation of deliberate effects. In gouache, the opaque watercolor style which allows an admixture of white with all pigments, mistakes have traditionally been painted out in white and the area repainted with color when dry.[42] The wash style's uncompromising transparency forbade such corrections, while its elaborate technical procedures practically guaranteed their necessity. One manual writer, before instructing the beginner in all the complexities of subtractive highlights, assumed defeat:

> when any subject is placed in light it will be necessary to draw all the details . . . to give it that degree of finish which alone can cause . . . satisfaction. Without such care the subject will appear bold and uncouth . . . and the whole will have an unfinished and defective appearance. Should a student find a difficulty in representing any particular object in light, it will be better to put such an object under shadow, where it will attract less attention.[43]

Not all artists were inclined to throw shadows over their problems, nor were they willing to subscribe to the wash-watercolorist's dogma that the only permissible white was light, that is, its reflection off paper, and not a white pigment.[44] With the development of zinc-oxide whites in the early nineteenth century, white crept back into the watercolor palette.

In eighteenth-century French painting, as represented in this exhibition by watercolors by Moreau *l'âiné* (45, fig. 3) and Natoire (46, fig. 1), opaque white—gouache—was used in two ways.[45] In one method, of which the Moreau is an example, white was mixed with all colors except the deepest tones, so that an opaque, rather cool pigment layer is consistent throughout. This practically negates any effect of the paper's hue except in the lightest areas of the sky. In the other, seen in both the Natoire and in Géricault's painting of the 1820s (19, pl. 4), white is not dogmatically excluded from mixture with other pigments, but it is principally used in its native hue as the lightest value. Both sheets are only partially covered with pigments, some opaque, some transparent. The papers are themselves dyed, so that their hues form the general middle tone in the images and provide an over-all dominant color, to be modulated rather than obscured by the overlying paints.[46]

Géricault's *English Horse Guard* was certainly conceived and probably executed in England at least a decade before Winsor & Newton introduced their zinc-oxide pigment, Chinese white. Yet it is painted with zinc oxide, proving that a workable permanent white was available to watercolorists in the early nineteenth century. Géricault, a French artist attracted to the English wash style, has here adapted the foreign technique to his native tradition's use of opaque white. In the translucent white reflections on the shiny horsehair, he has neatly dovetailed a characteristic of zinc-oxide white—"it has . . . a slight lack of

opacity, which gives it a bluish character when applied in thin layers"[47]—with his representational intentions—"Short-haired animals are often so glossy that the highlights upon them appear almost blue. . . ."[48]

Neither of the French gouache methods had much appeal to a watercolor school such as that which flourished in England at the beginning of the nineteenth century, which luxuriated in the brilliant luster of its new Whatman wove sheets and in the distinctive, pellucid English dry-cake colors. Yet the complexities of their developing technique led the English back to gouache. At first they employed white not in the earlier French manner but in three new usages that elaborated their wash style to a complex perfection.

The first was the gradual adoption of Chinese white as the only medium suitable for the creation of the finest highlights, where white paper reserves or scraped or lifted-out lights would not guarantee sufficient positive formal definition. This use was urged in particular by authors whose manuals incorporated Winsor & Newton catalogues:

> If possible the lights should be left when the washes are given; they will have more purity. . . . but never break or spoil a large wash for the sake of a few scattered lights. The broader the effect the better. . . . The smaller lights are often given by Chinese White. . . . there should, however, be great caution in its use, and no one part of the wash should bear the impress of its being different. . . . It is designed to produce the desired effect, without being observed as the "*Chinese White*" that gave it.[49]

Homer's *Fourth of July Fireworks* (22) exemplifies this use. It takes a sharp eye to see the touches of opaque white, together with scraping, in washes that Homer would not "spoil . . . for the sake of a few scattered lights."

The second use of gouache was popularized by William Henry Hunt in precious studies of nature's most cleverly crafted productions—fruit, blossoms, birds' nests, seashells. Ruskin described Hunt's watercolor technique to the amateur: "If you take [transparent] colour tolerably dark on your brush, only always liquid (not pasty), and dash away the superfluous wash on blotting paper, you will find that, touching the paper very lightly with the dry brush, you can, by repeated touches, produce a dainty kind of bloom. . . ."[50] Such a method of hatching, the child of the miniaturist's dotting touch, required a smooth and intensely white painting surface in order to reflect light through the deep-toned pigment layers. Hunt coated his paper with Chinese white, much as a prepared white ground had also been employed by miniaturists in the seventeenth and eighteenth centuries.[51]

Hunt's innovation was in continuing use of white in the course of painting, to draw light elements of his design in white gouache over washes, so that they read as positive forms even with palpable impasto. He then glazed the lights with intensely colored transparent washes, removing any appearance of opac-

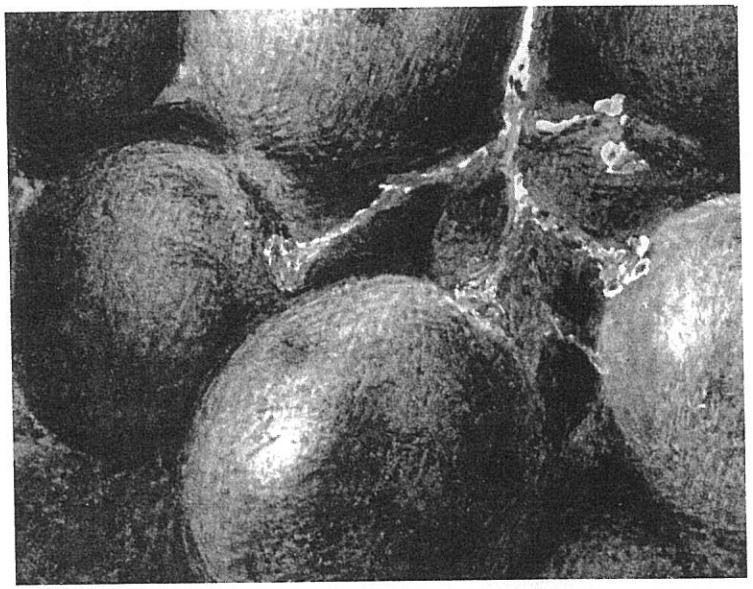

FIG. 17. William Henry Hunt, *Still Life with Fruit* (26, detail 200% actual size).

ity from the pigment combination and causing the details to gleam like particles of stained glass or gems. The grape stems in his still life (26, fig. 17) are painted in heavy white impasto (relative to the scale of the image) and dotted over with pure yellow, red, and green.[52]

The glassy firmness of Chinese white allowed this use; the pigment was known for its fluidity in the brush even when concentrated and for its resistance to washing up.[53] Although Hunt also used opaque white for concentrated points of reflection such as that on the glistening skin of the red berry in his still life, he equally would employ scraped highlights for diffuse effects such as the bright points within the stippled skin tones of his pear. It was his glazed impasto technique in particular that brought his pictures to the closest approximation yet seen to oil technique, despite their miniaturist touch.

Hunt's use of Chinese white prompted a contemporary observation that "It is quite certain . . . that as no luminous sky can be produced with body colour [opaque white], so no still-life of the highest excellence can be produced without it."[54] The sky, of course, is a light source, whose radiance is represented in watercolor landscapes by the white of the paper shining through the washes, whereas objects are perceived only by the reflection of light from their opaque surfaces. And the use of white was continuously advanced in still-life paintings such as Joseph Lindon Smith's image of a marble tomb (58) or in still-life details in larger works, such as the picture frame in Boldini's *In the Studio* (7, fig. 19).

Yet the third English usage of gouache was introduced in landscape, and it was the implications of its effect here, in its opposition of transparent and reflective surfaces, that would have the most far-reaching consequences in nineteenth-century watercolor painting. White was used as a dilute medium in the wash style, the white added to a considerable amount of water. This seems to have been Turner's innovation, and it may be seen in his *Simplon Pass* (61, pl. 6). White has been added to several passages in this painting, not merely to represent an Alpine glacier but to suggest the glimmering sublimity of the *idea* of mountains, of their hoary age, and of the ancient forces that formed them.

The effect of Turner's use of gouache was formulated by the manual writers. It became an expedient to make tints wash more evenly[55] and to achieve effects of distance and atmosphere in particular. It was not so much the pigment's whiteness that was desired; its extreme dilution guaranteed that the white of the paper would remain dominant. Rather, it was the pigment's handling qualities and opacity that were sought. Occasionally other light-hued and opaque mineral pigments were recommended for the same purpose: "opaque colors are very effective for giving an atmospheric appearance. Lemon chrome . . . is quite safe for use in distance, but it is decidedly difficult to handle for foreground, where reflected lights and colour and a transparent depth are so essential."[56]

OPACITY

The exploitation of the effect of Chinese white and other opaque pigments became as great a fetish as had been wash watercolorists' insistence upon absolute transparency. Having mastered the transparent technique, artists now emphasized contrasts in pigment characteristics, retaining, however, the conviction that their new method, like all the others so recently invented, would bring them closer to oil painting. An author (whose manual was published by Winsor & Newton) reported in connection with inorganic pigments newly introduced in the early nineteenth century:

> there was still wanting the means of employing opaque washings and solid scumblings of a tone higher than the ground in which they might be laid—a want suggested by the attempts of the artist in his desire to imitate the free and masterly handling which distinguishes spirited execution in oil painting. It was agreed that this could be effected only by the aid of a strong-bodied *white* paint . . . Chinese white.[1]

This use of Chinese white is exemplified in Ruskin's *Fragment of the Alps* (53, frontispiece), where there are in fact very few pure white touches in the main subject itself. Ruskin believed "that however white an object may be, there is always some small point of it whiter than the rest [requiring therefore] a slight tone of grey over everything . . . except the extreme highlights. . . ."[2] And so he mixed his Chinese white with a pale tint in all but a "small point" or two and laid it over transparent darker tones, which set out the broad masses of shade. Aside from its sheer opulence of color, the great beauty of the sheet is in the contrast of opaque colors against transparent washes. Pale stippling is laid over complex gradated washes, the lights casting a net of interpenetrating tendrils around a huge translucent gemstone. If the eye focusses on a single highlight, each separate form seems to float suspended over a pool of dim reflections.

Ruskin was acutely conscious of these positive effects of opaque lights, and he advocated working with opaque pigments rather than "merely transparent tints . . . not because the process is an easier one, but because it is a more *complete* one."[3] Specifically, he believed that it met oil painting on its own ground and triumphed, "being so far as handling is concerned, the same process, only without its uncleanliness, its unwholesomeness, or its inconvenience."[4]

In his *Elements of Drawing* he described his process, perhaps even reminiscing about the *Fragment of the Alps*, which had been painted the year before:

> Use Chinese white, well ground, to mix with your colours in order to pale them, instead of a quantity of water. You will thus be able to shape your masses more quietly, and play the colours about with more ease; they will not damp your paper so much, and you will be able to go on continually.[5]

Thus all the hazards and delays of wash are overcome, although his process has its own complications:

> you may have to ground with one color; to touch it with fragments of a second; to crumble a third into the interstices; a fourth into the interstices of the third; to glaze the whole with a fifth: but whether you have one, or ten, or twenty processes to go through, you must go *straight* through them. . . . The drawing in body-colour will tend to teach you all this, more than any other method, and above all it will prevent you from falling into the pestilent habit of sponging to get texture; a trick which has nearly ruined our water-colour school of art.[6]

The pleasure in contrasting white and opaque pale colors against transparent color glowing with light reflected from the paper below was carried by Victorian artists even to the extreme of the representation of flesh. English manuals, in contrast to French, traditionally had forbidden even a touch of white for skin tones: "Remember you are never to lighten it with pure White, which will rather give it the Appearance of Fish than Flesh."[7] But in Albert Moore's *The Toilet* (41) opaque white is used throughout, most notably in the heightening of flesh tones. The artist modelled the young woman's breast with fine touches of white to highlight its rising curve. The pigment's cool, reflective opacity evokes the silky firmness of the breast to a hand's caress and contrasts its swelling fullness with the transparency of warm shadows in the underarm and chest.

Moore's painting also depends upon the effects of opaque pigments other than white. His bright yellows and oranges were not dulled by the addition of white to render them opaque; they are inherently solid. The differences in relative opacity among pigments can be seen even more clearly in Nolde's *Woman* (47), where thin, uniform washes of color over black ink show the red to be transparent and the orange opaque in their colored substances, if not in their handling. Through the nineteenth century, color chemists developed and perfected new opaque inorganic pigments, descendants of heavy mineral pigments such as Vermilion, which had been interdicted in the transparent style and had been defined in eighteenth-century France strictly as gouache pigments because of their metallic origins.[8]

Occasionally, earlier wash artists had employed Vermilion conspicuously in final touches, its tendency toward washing up

FIG. 18.
size).

prohibiting any other use. Rowlandson developed in the 1790s a systematic method of overdrawing his near forms in Vermilion (53, fig. 18) to accent their lively expressiveness and to set their pale washes before the background forms, which were more softly outlined in gray.

Vermilion and other synthetic inorganic gouache pigments commercially available at the beginning of the nineteenth century[9] were soon joined by brilliant new compounds of chromium, cadmium, strontium, and barium, with improved cobalt, zinc, and synthetic iron mixtures contributing other hues. Mid- and late nineteenth-century manual writers in particular took pains to describe watercolor pigments specifically in terms of their transparency or opacity.[10] The commonest use of these colors, especially the opaque yellows, was as an alternate to white or glazed subtractive lights in oil-manner watercolor painting. The pigment was laid on with a dry brush in points, blobs, or discontinuous streaks that allowed the darker tones beneath to penetrate their forms.

FIG. 18. Thomas Rowlandson, *Mail Coach Going Uphill* (52, detail actual size).

A dry-brush stroke depends for its success on a touch as sure as that required to lay a dash of hard-edged wash. Formulistic abuse of the manner in gouache, degenerating into formless scrubbings, is as endemic as washer's puddles; but the style has had its masters. In Boldini's *In the Studio* (7, fig. 19) an ornate picture frame is represented partly by discrete touches of brown and creamy yellow modelled in impasto imitation of the gilded plaster carvings of the original; but the right edge, catching the light as if reflecting the radiant beauty of the studio model, is painted in a single dry-brush stroke. So sure was the artist of his touch, of the weight and consistency of his paint, even of the spring of his loaded brush, that he drew the entire length of molding in one gesture. The edges of the stroke are resolutely parallel, to guarantee a realistic representation of the geometry of the frame; but the pasty substance of the stroke was broken by its method of application into tiny points of opaque reflection. Carving explicitly indicated in the frame's shadowed cove is here only suggested by coruscating light.

Perhaps only watercolorists can fully exploit the play of reflection and refraction of light developed in combinations of opaque and transparent colors. Turner's use of reds and blues in combination in *Bally-Burgh Ness* (60) has already been noted. French watercolorists, once they became acquainted with the English transparent style, seized on this aspect of watercolor painting, to explore it in a continuation of their traditional gouache technique.[11] Lami's mid-century portrait of the *Duke and Duchess*

of Brabant (35, fig. 13) contrasts the intricacy of lacy detail drawn in opaque white with its transparency where the white of the paper gleams through. It manipulates the various aspects of transparent and opaque reds in the representation of fabric stuffs of all sorts and their colors reflected off metal buttons and the Duke's gorget.

Winslow Homer[12] provides the most subtle understanding of this facet of watercolor painting. In his *Hunter in the Adirondacks* (23, pl. 5) he contrasts opaque Cadmium yellow with thin washes and subtracted lights which permit the paper to shine through. By this device he represents the brightness of sunshine glittering through occasional gaps in the green canopy and reflecting off young undergrowth. The flickering yellow contrasts with the cool luminosity of the pervasive light filtering through pine branches as if through water, in an evocation of the complex light of deep shade.

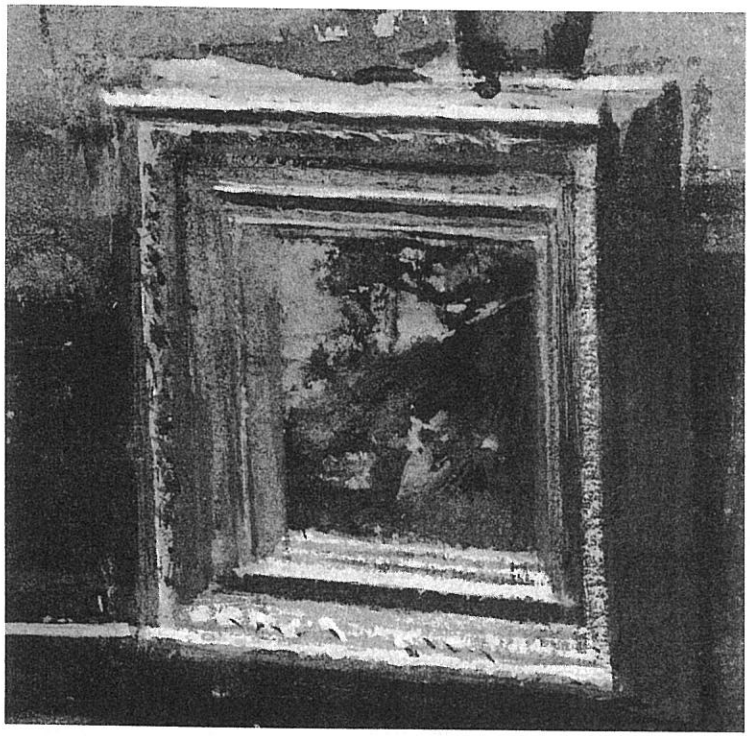

FIG. 19. Giovanni Boldini, *Girl Reclining in the Studio* (7, detail 135% actual size).

MOIST COLOR

In 1813 Ackermann announced that "the preparation of water-colours has almost attained perfection,"[1] but the penultimate was surpassed in only a few years with the development of moist colors. Ackermann was a colorman, and his enthusiasm for commercial dry-cake colors was not necessarily shared by artists, who seem to have quickly forgotten the irksome chores of color preparation. Dry-cake colors were criticized as hard and gritty, apt to crumble with heat or age,[2] and tedious to rub up into washes.[3] And so colormen continued to experiment with binders, directing their attention particularly to the addition of hygroscopic agents, which, attracting and holding atmospheric water within the color cake, would predispose it to softening and dissolving more readily.

Candy sugar[4] had long been a secondary ingredient of the gum binder of watercolors,[5] extra sugar being added to protect colors especially liable to drying out and fracturing.[6] In the early nineteenth century French color manufacturers substituted honey for sugar.[7] Their *couleurs de miel* were quickly copied by English colormen, who in the 1830s substituted glycerin,[8] a strongly hygroscopic, syrupy form of alcohol, for some or all of the honey.[9]

The new colors were christened "moist colors." They were not wet to the touch but were perceptibly sticky compared to dry cakes. Indeed, their binder might be likened to the gumdrop, which one author has recommended as a rough-and-ready substitute, should the artist be caught without his moist colors: "I have made moist water colors . . . by grinding pigments in a

thick sirupy solution of ordinary pale-colored gum drops. . . . These candies normally contain gum arabic, sugar, glucose, and glycerin in fairly good proportions."[10]

In 1841, shortly after the development of moist colors packed in porcelain pans, the metal tube container was introduced for oil paints. Five years later Winsor & Newton Co. adapted their moist watercolors for tubes.[11] Tube color must be more moist than moist color in pans, so that it can be squeezed out; and the demands of empire in late nineteenth-century Britain even required the development of especially moist moist color in tubes. Both Reeves[12] and Newman manufactured a "SLOW DRYING" form "specially prepared for use in Hot Climates," whose resistance to drying out in the tube was applauded in "Testimonials . . . from Military and Naval Officers, War Correspondents, Artists and others."[13] Winsor & Newton contented themselves with "BRASS BOUND BOXES FOR INDIA."[14]

Thus by mid-century the watercolor artist could buy his watercolors in at least three consistencies. Dry-cake colors did not become immediately obsolete, although at about the date of his *Moorland* (13), painted in 1846, David Cox was remarked upon for his use of "the old-fashioned *hard* cake colours."[15] As may be admired in *Moorland*, dry-cake colors produced the most brilliant wash effects; apparently the slight additional viscosity of glycerin or honey diminished the colloidal dispersion of the pigment particles and their even settlement upon drying sufficiently to be noticed by wash purists. Moist colors in pans were also apt to hold dust, a further hazard in washing.[16] Through the nineteenth century dry-cake colors were particularly recommended for preliminary washes,[17] as added glycerin or sugar renders all pigments not only more soluble on the palette but also more disposed to wash up on the sheet.

In the early twentieth century, when the sketch style with its emphasis on direct washing was at its height, dry-cake colors enjoyed a revival: "many artists have gone back to the use of hard cakes . . . with which the earlier men [that is, Cox *et al.*] obtained their delicate and luminous results."[18] Otherwise, only "engineering and architectural draughtsmen" used dry-cake color, presumably to guarantee the greatest possible transparency in finely detailed working drawings.[19] Finally, in 1974, Winsor & Newton discontinued their production of this first form of prepared watercolors altogether, from lack of demand.[20]

The immediate popularity of moist colors arose from their ease of use. The speed with which they could be diluted into workable consistency was raised by colormen's catalogues from a convenience to a positive creative force.

> In sketching from Nature, and, when representing transient and evanescent effects, the superiority of the Moist Colours is at once felt and appreciated. Ever ready for instant application, they enable the desired tint to be produced *at once*—a result unattainable by the old tedious method of rubbing dry cakes, which not infrequently permits the effect, and with it the *thought* of the artist to vanish. . . .[21]

This paean saluted moist colors in pans; one might think that moist colors in tubes would be all the more popular with the outdoor sketcher, being all the softer. In fact, this was not the case for outdoor work. Tube moist colors, requiring the addition of so little water, often caused the outdoor artist, working in haste to capture evanescent effects, to become careless. "Buy [moist colors] in pans," he was advised, ". . . by doing so you are more likely to mix well and properly."[22] Also, the heavy lead tubes were comparatively inconvenient out of doors: "When one gets settled in the countryside, the tubes upset, fall and roll away with the least motion."[23] And so, with the possible exception of certain colors that are better handled in closed tubes,[24] moist colors in pans have been preferred by the outdoor sketcher, or else he has squeezed his tube colors onto a palette before setting out to paint.

Tube colors were eagerly adopted by the studio painter, however, for whom their practical disadvantages were negligible. Their greatest attraction was proclaimed in Winsor & Newton Co.'s first advertisement for tube color,[25] which announced: "Moist Water Colours in Patent Collapsible Tubes. A new preparation . . . particularly adapted for large works . . . these

colours present a range of pigments, which, in brilliancy and similarity of manipulation, much resemble Oil Colours."[26]

The new colors were not perfected immediately. In an 1878 catalogue Winsor & Newton Co. confessed that they were "somewhat wasteful and troublesome in use" and had to be used "within reasonable time, as they do not keep so long or so well as the ordinary solid or 'Pan' form of Moist Colour."[27] In 1871 J. Barnard & Son advertised that their tube colors neither dried out in the tube nor fermented,[28] presumably alluding to the ills to which the new paint form was prone.

The viscous consistency of tube colors and their immediate accessibility at full strength and with substantial body attracted artists who otherwise would probably have continued to paint in oils. "Dreading the darkening of oil and disliking its greasiness,"[29] Burne-Jones created watercolor paintings so close in appearance to oils that several of his works were destroyed in well-meaning attempts to varnish them.[30] Burne-Jones preferred a "stiff pigment of the texture of soft cheese"[31] (tube colors resemble nothing so much as a well-ripened *Brie*), and he made free "use of the not long invented moist paints, ordering tubes and cakes by the dozen."[32]

Burne-Jones's exaggerated preference, which is seen in the heavily textured surface of *The Second Day of Creation* (9, pl. 2), led to difficulties when he attempted to paint out of doors. Flies, attracted to the gooey, sweetish mass of color, "came and settled on his drawings, and then rain . . . glued them on. . . ."[33] Such technical problems encouraged his natural disposition—"there seemed little reason for him to torment himself by a struggle with the outer world"[34]—and Burne-Jones, as well as most other watercolorists who have preferred tube colors, painted "from notes . . . and then dealt by memory and imagination."[35] Today artists' tube watercolors outsell pans eighty to one at Winsor & Newton Co.[36]

The added body of moist colors and of tube colors in particular led artists predisposed either to the imitation of oil or to the contrast of opaque color with transparent wash to use moist color full strength on the brush in a barely spreadable consis-

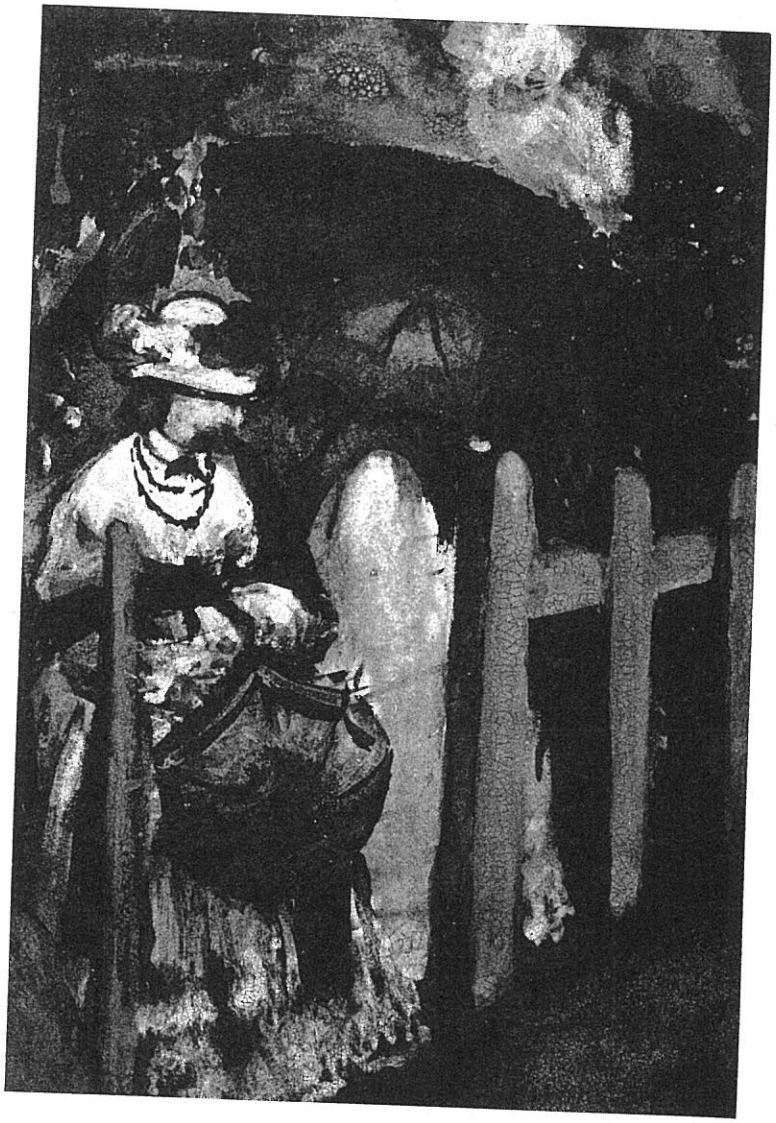

FIG. 20. Edouard Manet, *Race Course at Longchamps* (37, detail 150% actual size).

tency.[37] Even such paintings as Homer's *Key West* (24, fig. 8), conceived essentially in sequences of wash, feature accents of viscous, dragged moist color; the opaque Vermilion of the boot toppings of Homer's boats was applied straight from the pan and in such heavy layers that it has cracked over the years much as oil paint and varnish crack on aging canvas.

Watercolor artists of the late nineteenth century were perhaps less aware of the potential fragility of heavily applied colors or of color coated with a layer of extra gum than earlier painters, who had prepared their own pigments. The liability of fracture of such paint structures had been a standard test for over-gumming in earlier years, although even in the eighteenth century extra gum and other additives were utilized by miniature painters to enrich their jewel-like portraits. Gum varnish can be seen throughout the hair and costume of *Henry Hamilton* (2). Although in the age of washed topographical landscapes, the "shining of the Colours"[38] had indicated an excess of gum, such excess became a virtue in the imitation of oil painting.[39] Extra binder was incorporated especially in the gouache technique as practiced in nineteenth-century France, where without added gum the heavily whitened colors would have appeared chalky, dull, and old-fashioned.

Manet's *Race Course at Longchamps* (37, fig. 20) was painted in the full gouache style with white added to practically every color that was not used at full intensity, but its colors were exceptionally heavily gummed. The painting is therefore much lower in tonality than the earlier Moreau *l'âiné* (45, fig. 3), to which its pigments with their admixture of white are otherwise comparable. The Manet's paint "bears out." A close inspection reveals, however, that so much gum was added to achieve this richness that it actually foamed from the brush; note the cluster of dried burst bubbles at the upper center. Wherever the pigment hardened in thick layers, as on the near fence posts, a prominent crackle pattern is visible.

Other materials were advanced to approximate the color-intensifying effect of moist color used pure from the tube and of added gum arabic. The earliest manuals specified distilled rose-mary water,[40] which seemed to act also as a wetting agent to facilitate pigment grinding and inhibit the foaming of heavily gummed colors.[41] Others recommended ox-gall for the same dual purpose,[42] while eel-gall was even more highly regarded in the earliest manuals. Added to the wet color, it would give "all green, black, gray, and yellow colors . . . luster and *éclat*."[43] Ox-gall is a yellow substance that was also used as a pigment by watercolorists; presumably its use as a heightener would have been restricted to the same range of hues as was eel-gall.

The use of pure moist tube color and of extra gum or gall was soon supplemented by additives concocted by the colormen. Watercolor meglip became a particular favorite as, it was claimed, "This vehicle completely resembles in its effects those of oil painting."[44] Watercolor meglip was named in imitation of the mastic-varnish concoction highly popular with nineteenth-century oil painters, a translucent, viscous medium that gives body without opacity to oil paints. Fortunately for watercolorists and conservators, the water-based version of meglip is reliably permanent, whereas oil painters' meglip has caused the destruction of countless canvases.

Watercolor meglip was made from gum tragacanth, "a strong, colourless gum, soluble in hot water, and of excellent use . . . when a gelatinous texture of the vehicle is of use to prevent the flowing of the colours. . . ."[45] Meglip was advised particularly for near-ground, glowing details, to insure the solidity of heavily applied paints. Such a thickening agent may be detected in Burchfield's *August Sunlight* (8, fig. 21).

Evidently the sheet was painted, as is usual, on a slight incline. The pure dark washes applied to the centers of the sunflowers sagged slightly to form a slight bead of color at their lowest points, effectively modelling the convex forms. Such watery paint could never have coated the intensely dark, large areas of the houses without the weight of accumulated liquid breaking their lower bounds, and so Burchfield added a thickener to his paint in these areas. It not only contained the washes but also allowed Burchfield to model his surfaces, since the paint retained the track of his blunt-tipped brush.

Unlike gum arabic, gum tragacanth does not cause the paint to which it has been added to shine when dried; thus it could be worked into a washy painting such as *August Sunlight* without interrupting the general uniformity of its surface. Watercolorists working in the oil manner did not consider this a virtue, however: "As the Meglip causes the colour to dry rather dull, glazings of transparent colours are necessary. . . ."[46] Fortunately, gum tragacanth not only dries hard but "fixes the underneath colour so that other tints may be washed over with freedom,—an advantage to be gained by the use of no other vehicle."[47]

Painters have experimented with many other vehicles and colormen have patented many other concoctions to vary the handling and drying properties of watercolor. Winsor & Newton Co. now provides a sort of "super meglip" in its Aquapasto, a mixture of gum arabic and silica in the form of a translucent jelly that allows the modelling of watercolors in high relief.[48] Other natural resins such as gum ammoniac and sarcocolla were advocated as hardeners for the dried paint film in the nineteenth century,[49] and the synthetic resin polyvinyl alcohol has been suggested in more modern times.[50]

In the last few decades synthetic acrylic resins have been perfected in water-emulsion paints that combine the attributes of gum or gall to heighten pigments' hue and luster, of pure tube color or meglip to give translucent body to the paint mass, and of meglip or fixatives to give solidity to the dried film. Acrylic paints are commonly handled in a thick consistency on canvas,

FIG. 21. Charles Burchfield, *August Sunlight* (8, detail actual size).

the oil painter's traditional support, with his traditional tools, stiff brushes and a palette knife. There is, however, no technical barrier to diluting the acrylic medium with water to the point where the paint handles much like traditional watercolors. The tough dry acrylic film does not, however, permit subtractive highlights.

Many different synthetic resins have been formulated into proprietary mediums by artists' suppliers. Reeves & Sons has lately followed its eighteenth-century invention of dry-cake colors with the introduction of an acrylic polymer emulsion in water bearing its name.[51] The modern manual writer assures us that acrylic emulsions used in the watercolor style "can do just about everything that traditional watercolor paints can do, plus a great deal more,"[52] and synthetic resin additives such as acrylic matte medium and gel can carry the effects of meglip and other gum additives to the exact imitation of oil. Just as the prejudice against opaque white was rapidly overcome when stylistic ambition coincided with technical advances, so too the watercolor painter of today may find that the physical properties of acrylic paints will complement his vision and sire their share of masterpieces.

PRESENTATION

With the exception of larger miniatures and cabinet portraits,[1] watercolor paintings in the first years of their period of highest fashion were not hung up for viewing. They were pasted into albums, to be savored in sequence and at length. In 1813 "Amongst the most polite circles, the library [had] become the place of refined amusement in the long evenings, not only within town houses, but during their residence at their country seats. . . ."[2] In the eighteenth century these country seats were often themselves the subjects of the paintings. After the end of the Napoleonic Wars, watercolor views extended the armchair sightseer's prospect beyond his home and county through the world at large. The *peintre voyageur* went on the Grand Tour, and the returned traveller was encouraged to "separate the album and enframe each sheet to make a gallery or collection of varied and precious paintings, through which he can relive his voyage."[3]

Through the same years professional watercolor painters were ambitiously pursuing their chimera of the attainments of oil painting, which led them to insist that their medium be recognized as worthy of public exhibition.[4] In 1780, on the event of the inauguration of the Royal Academy's first official residence, the anteroom of the galleries at Somerset House was given over to watercolors and drawings.[5] Presumably these watercolors, among the first to go on public show, were displayed much like Blake's paintings that were exhibited in 1785 in "close rosewood frames (a far from advantageous setting)."[6]

The separation of watercolor and oil paintings in exhibitions has been commonly maintained to this day, as it is generally believed that "they greatly injure each other's effect."[7] When watercolor has been considered a minor art form, wash paintings have usually been relegated to a decidedly inferior position: "water-colour drawings would form a fitting decoration for a *boudoir*. . . ."[8] The anteroom of the Royal Academy was lit by side windows and was a less prestigious gallery than the Grand Exhibition Room, which was reserved for oil painting. Watercolors that hung in the anteroom and other secondary galleries were framed under glass for their protection and were practically invisible in the glaring reflections.[9] Artists and manual writers objected to the glazing of watercolors for this reason and recommended varnishing in its stead.[10]

Watercolor paintings mounted on board and varnished, moreover, would more closely approximate the appearance of oil paintings on display;[11] and artists who have aspired to exhibit their work in direct competition with oils, from Paul Sandby in the eighteenth century (54) to contemporary painters in watercolor and acrylic,[12] have employed varnish. Early varnishing techniques, which used natural resins such as copal or mastic, were adapted for watercolor by being laid over a priming of several coats of thick, warm isinglass, "to prevent any part of [the