

PROGRESS REPORT  
ON  
NBC COLOR TELEVISION  
Design and Creative Arts

Norman Grant, Director

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## FOREWARD

This report will show the progress made by NBC in color television from its introductory year, June 1953, to the present date, in the following departments; Scenic Design, Costume Design, Make-up Development, Graphic Arts. It has also been used as a basis from which the NBC Color Corps prepared its first booklet on production and creative techniques for color television. This was accomplished in early May 1954, embodying only that information that could be released and not considered confidential. It was distributed to all the affiliates that attended the Color Seminar.

I would like to give credit to the following people of my staff who have been most helpful in preparing this report:

Burr Smidt .....Color Consultant  
Dick Smith.....Make-up Development  
Ed Bennett.....Graphic Arts  
Cliff Stiegelbauer....Scenic & Costume Design

Before plunging into a discussion of a medium which encompasses a multiple of variables, there are certain basic points that should be made.

First: The vast changing of ideas and techniques in the color system plus the training of an artistic staff will, at times, unfortunately seem to conflict and overlap. We are going through the same growing pains that were experienced by all other color mediums in the past -- but fortunately, by profiting from their mistakes, we can arrive at an adult color system much sooner.

Second: Even though all personnel of the design and creative arts operation have had training in color and the opportunity to do at least three or more color shows during the introductory year, there are still many unanswered problems and new undiscovered techniques. Unfortunately, due to the type of programming we have had since September, little or no experience has been acquired by our staff personnel. The reason is that all but three Spectaculars have been done by free lance personnel. On the other hand, the commercials that have accompanied these Spectaculars have been handled exclusively by NBC personnel who have been able to profit from the newly developed techniques in these commercial areas.

Third: We must make the stipulation that all who read this report have at least a basic knowledge of color, since it would be most impractical to go into the complete theory of color in this report. Our primary consideration in preparing for color television is to realize the many variables or changes -- changes caused by environment, illumination, and their effects on the electronic color system. These elements will always exist and it is our responsibility to understand them.



Fourth: Color as the camera sees it is only as good as the artistic people who employ it, provided they have a working knowledge of what this color medium will or will not do, when transmitted. Because of this knowledge, it is absolutely necessary that the artist and engineer work as a team. I am happy to say that this has been accomplished in every case where NBC staff personnel have been used on color shows during the introductory year and since September. An honest exchange of ideas between the artist and engineer has brought about many new developments and techniques that otherwise could not have been accomplished during this time.

Norman Grant  
Director - Design & Art



MAKE-UP DEVELOPMENT



DEVELOPMENT OF NBC MAKE-UP FOR COLOR TELEVISION

INTRODUCTION:

Development of make-up for color has passed through the same progressive stages as did make-up for black and white television. In both cases, we were faced with the responsibility of creating materials and methods to suit the immediate needs of a new and growing medium.

In the beginning, it was necessary to make changes whenever technical improvements were made or new problems arose which challenged our ingenuity.

The first problem of color make-up is to make sure that skin tones are reproduced as naturally as possible. At the present time, studio color-casts require lighting averaging 400 to 500 incident foot candles and have a color temperature of 2900 to 3000 degree Kelvin. Under these conditions, the color system makes all color appear brighter.

Most people have red pigment in certain areas, such as: lips, nose, cheeks, ears and neck. When they are colorvised without make-up, the red appears exaggerated and the appearance is blotchy and unnatural. Toning down of this redishness is the first aim in color make-up. It is also possible that due to the intensity of lighting, many people need make-up to prevent them from looking pale and gray.

Similar problems are created by dark pigmentation around the eyes, the grayish tone of a man's five o'clock shadow, freckles, blemishes, etc. These areas must be made up to produce a pleasant normal flesh tone.

PROGRESS OF COLOR TV MAKE-UP:

Prior to the spring of 1953, many different shades of available theatrical make-up were tried but found to be too red or orange. By process of elimination, we found that the best colors on the market were the Max Factor Panstik street make-up (natural, medium, olive, deep olive, etc.) that are fairly natural in color although much warmer than those which we now use.

At first, the lightest of these colors was used for women and the regular TV make-up was used for men. Later, the medium shades were used on women and the darkest on men. The results were pleasing but quite rosey and unnatural. This was not critical in a colorful musical number but was very apparent in a dramatic type show.



The summer of 1953, I contacted Max Factor and Company of Hollywood to see if they would be able to work with us in developing a new make-up palette for color television. In September of 1953 Max Firestein and one of the lab technicians of Max Factor spent several days observing our color at the Colonial Theatre. We tested Technicolor shades which Mr. Firestein brought with him and found them to be too red. Consequently, as a result of our suggestion, they agreed to make a range of colors similar to the street shades we had been using at this time but containing less red. This new series (which was called CTV #1 through #10) arrived late in October 1953.

Also in September 1953, we conducted our own tests of various make-up bases which we developed. Color for clowns, negro characters, old age characters, etc. were tried and found successful.

The CTV Series supplied by Max Factor was slightly better in color and gave us darker shades to work with. Make-up for both men and women became darker. CTV Series 3, 4, and 5 was used for women and 6, 7, and 8 for men. However, we found that this CTV Series was still too red, particularly when a subject was sunburned. Sunburn, incidentally, is a terrific problem and necessitates use of extremely cool color bases in order to cover it. Max Factor was asked for another series with less red (or more green) in them. These were called CTVG #1 through #10 and arrived in November 1953. The CTVG Series definitely toned down complexions with a strong reddish pigmentation -- but in long shots or low key light, these shades tended to take on a greenish-yellow cast.

We then experimented with color which we grayed down with black instead of green. Samples of these new mixtures were sent to Max Factor. This latter series is called CTVA #1 through #10. It was tested in February 1954 and found to be an improvement over the CTVG Series, but further correction was necessary because our original samples were not perfectly matched by Max Factor. We prepared further samples which produced perfect results on shows. Max Factor has corrected the CTVA Series to match these new samples which produce subtle, natural flesh tones. These final colors are in two series which cancel out all previous experimental numbers. The first series are CTV #1 through #15. The second, CTV 1-W through 12-W.

Max Factor and Company of Hollywood is now supplying our needs, as well as the affiliates with these new make-ups for color television both in Panstik and Pancake make-up.



MAKE-UP TIME REQUIREMENTS:

Color TV requires much more time for make-up than black and white for many reasons. The difference between those persons wearing make-up on color television and those not is quite apparent. Body make-up is necessary most of the time, while it is hardly used in black and white. The heat of the studio lights necessitates more retouching of make up.

FOUNDATION AND APPLICATION:

Two sets of foundations were designed to meet the various conditions in color television. Each set consists of related flesh tones beginning with a very light shade and progressing to a very dark one. The set labelled CTV, with numbers 1 to 15, has cool, natural tones with very little red in them. This series is suitable for all make-ups, but is particularly desirable where the most subtle and realistic colors are appropriate. CTV #1 and #2 are generally used for highlights for either straight or character make-up. The standard shade for female make-up is #4, but #3 and #5 are also used on occasion. Number 6, 7, and 8 are for men -- the standard base being #7. Numbers 9 through 15 provide various dark shades which may be used for corrective and character shadowing, or as darker bases for special problems.

The second set of foundation colors is warmer (has more red in it) than the first. Called CTV, numbered 1W through 12W, it is designed for shows where bright colors are more important than realism. Use it for comedies, musicals, fashion shows, etc. Its numbers correspond to those of the "cool" series, so that #4W is again the usual shade for women and #7W for men. Numbers 10W to 12W may be used for character make-up.

Both sets of foundations are made in the Panstik (or grease) form. Pancake is made in one series of shades which are about midway between the warm and cool Panstiks. They may be used for facial make-up or body make-up to go with either of the Panstik sets.

The technique for applying bases for color television is different from that used in black and white. Do not apply the base heavily. Keep it very thin, allowing some of the subject's natural coloring to show through except where the skin is very red. Usually, men's lips should also be covered with a little base.

The "five o'clock shadow" on men often needs special attention. When Panstik is used heavily, the jaw sometimes looks slightly greenish on camera and should be rectified by adding a little warmer color to the Panstik in that area. When using Pancake as a base, first cover the beard with Panstik, then powder it and apply the Pancake all over.



### ROUGE AND APPLICATION:

Rouge is generally used for female make-up, but rarely for men. It is available in cake (dry) and Panstik (cream) form. The cake rouge is called CTV Light Tech; and the Panstik, CTV Cream Rouge. When using a Panstik base, blend in cream rouge before powdering or apply dry rouge with a soft brush after powdering. If Pancake Base is to be used, first blend on cream rouge and then apply the Pancake over it, or apply the Pancake first, add dry rouge with the wet Pancake sponge and apply more Pancake over it to complete the blanding.

### EYESHADOW AND EYE MAKE-UP:

For eyeshadow, CTV Brown or Gray are recommended for the most natural effect. Max Factor's blue-gray lining color is excellent when a bluer tone is desired. Other shades of eyeshadow may be used at the discretion of the make-up artist.

Eye make-up techniques are similar to those used for black and white television, except that the color of the eyebrows must be considered. Therefore, eyebrow pencils in colors matching the hair should always be used.

### HIGHLIGHTS AND SHADOWS:

Corrective highlighting and shadowing for straight make-up must be done with great care. A dark shade of foundation should be used on a double chin or a bald head that catches too much light. Shadowing a broad nose must be done delicately. Highlights are particularly advisable in the circles under the eyes and sometimes above the eyes when they are deepset. Make these your last steps before powdering so that the make-up will be smooth in the tiny eye wrinkles.

### POWDER:

Powders for color television should have very little pink in them. Max Factor has a CTV Neutral powder which can be used for all foundations. Pure talc (not talcum powder) will also do a good job on all but very dark make-ups.

### LIPSTICKS:

Special lipsticks in subtle colors have been designed to go with the CTV foundations because normal lipsticks usually look fiery red. The special shades are: CTV Light Red for blondes or others with pale complexions, CTV Medium Red for brunettes or average complexions, and CTV Orange for redheads. If a darker color is needed, you can use CTV Deep Red. However be careful that the lips do not appear too dark on the black and white TV picture. When the warm CTV series of bases is used, light shades of regular lipsticks are permissible.



### BODY MAKE-UP:

Body make-up is most important for color television. If body make-up is not used, the skin generally looks too pale or too red. Pancake is the most convenient material to use. Apply with a large sponge. When light strikes the chest and shoulders more intensely than the face, use one or two shades darker Pancake body make-up in these areas.

### HAIR COLOR:

Several problems arise concerning hair color. Very white and platinum hair should be darkened slightly with a black hair rinse. White wigs of off-white or light gray hair are preferable to the pure white wigs. On the other hand, it is necessary to whiten dark hair for an old age make-up. Use Max Factor CTV hair whitener. It has a creamy color that produces a more natural color than pure white.

### CHARACTER MAKE-UP:

Character make-up on color television requires subtle and well blended highlights and shadows. CTV #12 is an excellent color for shadow. 665-0, P, Q, or R may be used to accent very dark shadows. Highlights are normally created with CTV #1. If special colors are needed, they can be mixed as desired by using the Panstik primary colors: Red A, Yellow A, Green, and Blue in combination with other Panstiks. Black Panstik and White Panstik should also be kept on hand for character make-up mixes.

If rubber noses and other pieces are used as part of character make-up in color television, they should be made up with a shade of Max Factor's Rubber Mask Grease Paint which matches the foundation on the rest of the face. It should be noted that the color of the material changes when it has been on the latex nose, face piece, etc. for a couple of days.

### NEGROES:

Negroes should be made up with one of the high numbers of the CTV Series or 665-0 through R. If a normal golden hue is desired, add 665-M to the base. For eye shadow and corrective work, use the darkest #665 series. Red A Panstik provides a good rouge for dark complexions. Regular shades of rouge can be used for the light colored negro. The color of the lipstick will also depend upon the pigmentation of the individual. Darker shades of red lipstick should be used but they do not necessarily have to be darker than the complexion since the color will provide enough contrast. Brick-red shades are usually in better harmony with the negro skins than the purplish colors.



OUTDOOR MAKE-UP:

Since the quality and intensity of outdoor light varies considerably, it would seem that a great many different types of make-up would be necessary for daylight color television. Actually this is not true because the color cameras can be adjusted to the particular light conditions so that nearly identical results are obtained throughout the day. There remain just a few general variations in lighting to contend with. The performer may be in direct sunlight, in open shade, or under a very gray sky. Any of these situations will be complicated further by having a very light background, such as a white house, or by having the subject move from one type of light to another in the same scene.

In general, daylight is colder or grayer than the incandescent lighting normally used in color studios. Hence, the make-up colors instead of being subdued and grayish as they are for indoor use, should be intense and warm for outdoor pickups. The foundation colors should be bright shades which are neither high in yellow or in blue. Unfortunately, there is no single make-up series on the market with the proper hues throughout the scale. But a scale that is very nearly correct can be formed from parts of others. Thus, the Panstik foundations for outdoor color should read; starting with the lightest shades: #21, 22, 23, 24, 626A, 626B, 8N, 9N, 10N, 11N. With Pancake foundations, it would be possible to substitute 5N, 6N, and 7N for the 626A and B.

The average color under either direct sunlight or open shade is 626B for women and 9N for men (sometimes it is desirable to use a lighter color for open shade). This does not mean that a subject can walk from direct sunlight into shadow and still look all right. At this point it is very difficult for the cameras to adjust to such radical changes in light and consequently, the subject is bound to look too dark in the shadow or too light in the sunlight. On the other hand, if there is a minute or two to alter the makeup, the transition can be made more successfully. An actress going from sunlight to shade should be lightened with a wash of 23 Pancake and additional rouge. Working from shadow into sun would require the addition of a darker wash, particularly on the forehead or any other area that tends to bloom.

Very dim gray light requires the lightest and pinkest foundations. Number 23 is average for women and 626A for men.

Whether in sunlight or shade, rouge (Light Technicolor) should be used rather generously on women. Forehead and chin can be rouged as well as the cheeks. Men may also be rouged, but more subtly. A very warm Pancake in a darker tone is advisable for toning down areas washed out by direct sunlight, such as the forehead, cheekbones, etc. Numbers 2A and 7A (preferable) are excellent for this. On the other hand, when the light is extremely dim and gray, it is necessary to apply a great deal of rouge. It is possible to make the entire make-up redder by washing over it with P6-52 or 651-XLT Pancake (the latter is the darker shade).



Lipstick for women under all outdoor conditions should be as light and as bright red as possible. Our CTV lipstick #40 or Coty's Sub-Deb "Light" are satisfactory for normal conditions. There is nothing available at present which is quite adequate for very dim light conditions, but we are developing a new shade for this purpose.

Make-Up for the eyes should be similar to that used in the studio except that sometimes it is necessary to use less eyeshadow and also to use more highlight in the circles. Other techniques which have not been mentioned may be considered to be similar to studio practice.

The foregoing analysis should not be taken to mean that all subjects should be made up. In general, persons with good color in their faces will need little make-up. Men's "five o'clock shadows" should be covered and foreheads darkened if exposed to bright sun. Women should be checked for the proper shade of lipstick and sufficient rouge. These are minimum requirements for obtaining a satisfactory color picture.

#### RETOUCHING OF MAKE-UP:

Since color make-up must be worn for long periods of time, during rehearsal and airing of the show, frequent retouching is necessary. If the foundation has worn off in spots, go over it lightly with Pancake Make-up. During the rehearsal and show, it is important that the actors be powdered frequently to keep them from shining. A shiney face does not actually look bad on color, but it appears very greasy on black and white.

#### CONCLUSION:

In concluding, we would like to stress several important points. Foremost is the fact that the television audience will judge the trueness of the color by the naturalness of the flesh tones. For this reason, make-up is both extremely important and critical. The make-up artist must choose his colors with care; applying them with subtlety. Above all, he must use make-up sparingly in order to avoid masking the natural skin tones with a heavy coating of make-up. Moreover, it can readily be seen that to obtain consistent good quality, it is essential that all color make-up (at least for the present) should be applied by trained personnel.

Finally, it is hoped that the fundamentals outlined here will not be used as an absolute, but rather that they will be applied with artistic discretion to meet the many variables of the electronic system and conditions of light. Changes in the above standards will be made as the color electronic system progresses. However, it is believed that every step that has been taken in the past has been necessary and not wasted time.



SCENIC AND COSTUME DESIGN



DEVELOPMENT OF SCENIC AND COSTUME DESIGN FOR COLOR TELEVISION

INTRODUCTION:

For the purpose of showing the necessity of teamwork between the scenic and costume designer in color television, we have combined these two areas into one report.

In black and white, it was often possible for the set designer to work independently from the costume designer, with an occasional telephone call after the production meeting to check gray scale values and design. With the added dimensions of color, these two areas must now compare color and design if they are to have complete and harmonious understanding of this subject.

In most cases, the costume designer is responsible for the foreground color; while the scenic designer is responsible for background color and mood. Collectively, they are responsible to each other.

PROGRESS OF SCENIC AND COSTUME DESIGN IN COLOR:

Representatives of both scenic and costume design have worked with color television over the past three years. As stated in Make-up of this report, the prime interest in this early period was to create acceptable flesh tones. Both costumes and background color played an important role in complimenting this operation.

Until two years ago, the cameras seemed to be unable to sustain periods of use. During this early development, we were aware of some color fading and a great deal of unbalance within the system--even between the opening and closing of a 15 minute show. It was also necessary to use a higher light level than is used presently which threw the sensitive and more reflective colors out of key. Because of the many variables in the system during this experimental period, it was next to impossible to record or set pigment and fabric standards. It must be understood, however, that we did receive an immeasurable amount of experience during this period that is helping us with our present and future findings. Changing concepts in lighting and improved equipment have definitely added great scope for the designers' and lighting directors' jobs. One of the most important things we have learned from this experience is that the designer, costumer, make-up artist and graphic artist must understand the color value range as it relates to the color electronic system. When dealing with colors in fabric, pigment, etc., these people (especially the designer) must know at a glance what that hue or shade will do when televised by the color camera. An experienced eye for color can see the predominant color in a color mix and will know that this color will probably be noticed more by the camera's critical eye. At the present, color selection comes only with experience. We are now working on a yardstick of standards that will help as a guide in color selection. Armed with this information and an artistic taste, the creative talent mentioned above will develop a sense of security in what will appear on the color television screen.



There are no absolutes in color and the yardsticks of standards as mentioned will only be the jumping off point into unlimited fields of exploring. Once the artist understands the system in which he is working, it is up to him to create the harmony within the boundaries set by the system. These basic standards that are to help in color selections will not come easily or with speed, since it can only be as accurate as the system is stable. There are still variables in the system that keep us from publishing the information we presently have. One thing is certain -- more instrumentation is needed to help hold the system in a more stable condition. When this has happened, we would be ready to release the standards mentioned above. Even then, the color and fabric standards should be treated only as a trend rather than absolute, for it would be almost impossible to publish an intelligent report of standards covering the entire field. As many positions as there could be for the camera, with the millions of color combinations, not to mention the angle of light and light temperature -- it is easy to see that such a cumbersome report would be of little value. We have no intention of establishing such standards that would limit the creative potential of the artist. This in itself would be a mistake. Therefore, we will be satisfied with standards that point a trend rather than an absolute.

#### TESTING FOR COLOR CHIPS STANDARDS:

Much time and effort has been expended in testing color chips against the Munsell Gray Scale both in black and white and color television. Each color chip is placed one at a time on the Munsell Scale (1.0 black to 9.5 white.) This information is then viewed on a standard black and white television as seen by the color camera, to determine gray value on black and white television. In other words, our compatible information is established between color and black and white. At the same time, another observation is made of this same color chip on a standard color television monitor. A chip of the same color as the one being viewed by the color camera is placed adjacent to the color television monitor in the control room and is illuminated with the same light source as the monitor output. The light source used to illuminate this color chip adjacent to the color monitor is illuminance "C" (6500 calven). The light source used in the studio to illuminate the color chip seen by the camera is illuminance "A" (2850 calven).

During the early stages of these tests, we found it very difficult to duplicate from one day to the next the information we learned the previous day. We also found that the final step of lining up the color monitor was being done by color memory rather than by instrument. Since our color memory is not as accurate as we would like it to be, we were getting a variable in the monitor line-up from day to day. After giving this considerable thought, I asked the engineers if they had any objections to our using a mat device that would fit around the face of the color monitor with a matching Gray Scale at the top and bottom of the mat. By looking through the mat to the monitor (with the color burst removed) we were able to have a visual reference between the gray scale seen on the monitor and that of the mat. This is only a makeshift in matching, but certainly has helped us to maintain a standard reading from day to day. Instrumentation is the only answer to this monitor line-up problem which the engineers have been working on for some time.



This method of monitor line-up mentioned above has only been used in 3-H and on these tests. It was thought of using this visual measuring method for all monitors in the various color studios, but to the best of my knowledge this has not been accomplished.

On the following page you will see a chart "Summary Results of Color Chips Tested". The chips used in these tests are from the Color Harmony Manual Color Wheel. You will note that the color shift of these readings, taken over a period of four months, indicate a shift counter-clockwise on the hue circle. Dr. Shelby expressed great interest in taking the same information and using the exact method of monitor line-up to test the Colonial Theatre, Brooklyn and the new West Coast Studios to see if this shift is constant in each of the electronic systems. If it should prove that they are constant throughout, our problems are not nearly as great as if there is a variable in each system. Since the cancelling of monies for research in color as of September, this has not been accomplished - but certainly should be number one on our priority list.

The Color Harmony Manual used in these tests is based on the Ostwald Color System. Each Ostwald color notation (in the Color Harmony Manual) has been cross-indexed with the Munsell color notations as to light measurement. Since the engineers use Munsell Notations, it has been a great help to have these two systems cross-indexed. Many agencies and major industries dealing in color use both Color Harmony Manual and Munsell Manual as reference. This will allow us to publish our findings keyed to these two systems, at considerably less expense to NBC than if we had to publish a manual including color chips. It must be remembered also that even if we should decide to publish a manual including color chips, there would be constant changes to the manual as our system and knowledge of the system develops. Keeping such a manual up to date would be a major expense. It is therefore recommended, when and if we publish our findings, that we give only our color notations (minus color chips) as keyed to these two color systems.

Engineering has gone on record stating that even though these tests that we have conducted prove not feasible for publication, it has more than paid for itself because of the knowledge it has provided them. Certainly Management should provide for the continuation of these tests -- at least until a satisfactory solution has been reached.

An example of these tests regarding compatibility for black and white as well as color and the difference between the actual color and that seen on the color monitor is shown on the chart following the "Summarized Results of Color Chips Tested." We have tested approximately 450 colors. This is the half-way mark on the colors we intended to test.



DESIGNING FOR COLOR TV:

Designing for color brings new problems to the designer and, to some extent, the other people connected with programming and productions. Once the script for a production and/or commercial is tentatively set, the gears of the industry are put in motion. The designer finds himself faced with a problem few Broadway designers face -- namely, time. As in all phases of television, time is at a premium. (It is always later than you think.) The designer must take the script, create a setting and costume the show to fit the mood of the production, and yet not equal the national debt in cost.

Basically, there are no new methods for usages of color designing for the color system other than a limitation of extreme contrast ranges. Generally speaking, offensive colors will be seen on the color system only when they are used by the designer. If the artist's original color planning is bad, it will not look better because of color television. The designer or artist must of course understand the value range within the limits of the system. When designing for color, we try to work within this value range. You can select any color, or any number of colors, or any intensity of a color you desire; so long as you maintain the established value range. Or you may select any color key you desire -- high, middle or low -- provided you stay within the chosen key. An example would be to select a value range between 1 and 6; or a middle range between 4 and 8, or a high key value range between 6 to 10; as related to the gray scale. This allows the use of white and black. Once you jump outside of an established value range with a highly contrasting value, there is a lack of balance and a corresponding tendency to lose color. Dark colors become darker -- and light colors wash out. Here is our control for facsimile color. If a loss of color is detected when televising and it is not due to the electronic system or the lighting, we know immediately that a value adjustment in the physical color will correct the loss.

The above statements are only true when you must reproduce facsimile color. This would be most true in commercials, since the home viewer has some visual reference in his color memory for comparison. On the other hand, we have used successfully colors with great contrast (outside of the value range mentioned above). By doing so, there is generally a shift in color. However, if this shift does not give offensive color -- and you have a harmonious picture -- who is to say the color you are televising is not true; since the home viewer has not seen the original color. The balancing factor in these cases is flesh tones that are acceptable.

The above points must be understood by the creative team, since the men behind the knobs (the engineers) are confined to what is placed before them.



Another important consideration which can be overlooked is the intergration and flow of color in a show or within scenes. In cutting from one scene to another, with changes predominantly in violent contrast to the previous scene, there is an unnecessary shock to the observer. Some effort should be made so that the scenes flow in color more carefully from one to another. This same condition becomes apparent in the commercials, where a scene may be of one predominant mood of colors and then cuts to a completely different mood or set for the commercial. This is a problem which we have a present in black and white television, but it is emphasized by the use of color.

#### FINDINGS ON BACKGROUND COLORS:

Obviously many colors reproduce better than others under practically any condition. These of blue-green mixture often confuse the system, sometimes sliding one direction or the other. Some tans, beige, etc. also seem to reproduce poorly; drifting to reds or sometimes to greenish casts. Some yellows can be troublesome depending upon the mix. Grays have a tendency to drift to the direction of the predominant color mix.

Backgrounds of dark-grained wood must be treated with great care. Metallic gold, silver and bronze tend to go hot, but can be handled. Deep violets, deep reds and maroons tend to go black.

Settings where wallpapers or stencil patterns are used, the following points are recommended. It is favorable to keep wallpaper colors soft; neither background nor pattern should have violent contrast. When blending behind wallpaper, the blend has to be both smooth and even. It is worth the time and effort it takes to achieve such a blend, rather than to have extreme contrasts. This is much more noticeable on a color television receiver than on a black and white receiver.

Tops of settings should be darkest -- this aids the lighting director. Reality is added to a room by having the darker shade on top, but this shading must be done with great care.

Huge ceiling pieces which might black out light should be avoided. In the lining of mouldings and the painting of ornaments; light, shade, shadow and cut line are necessary -- but a high flash or highlight should be avoided, since they tend to draw attention to that spot.

When ground rows are being used to mask light strips on floors, it is an advantage to paint them light along the top edge, then blend it down into the floor. This aids in softening a sharp line normally caused by the extreme of concentrated light from the base of the sky eye.

#### FLOORS:

To help create a better picture, the use of the floor as a source of reflected light is necessary. The linoleum floors of our New York studios have been painted to give this condition. Plans are now being considered for using a semi-gloss floor to help with



this reflected light and to enhance the over-all picture. The following colors have been found safe and most practical for floor paint in the warm family: dusty cedar, ash rose, cedar rose, copper tan, rose taupe, cork tan. It is also possible to use grays --warm or cool.

A general floor mix for all-around safety is as follows: Start with a white base and add enough black to bring to approximately 5.5 to 6.5 Munsell neutral gray; add enough red to bring the color to dusty cedar. When this color is freshly applied it may look light and pinkish, but after being walked on during rehearsal, it is grayed down and is usually quite compatible. If still too light, it can be made useable by fine and even spattering with a darker warm tone.

#### TAPING OF SCENERY:

The taping of scenery cracks in the studio must be done with great care. Always use the original paint mix instead of mixing an eye match. It is usually found that the paint turns darker on the tape and must therefore be lightened slightly. Extreme care must be used in painting the tapes, so that the paint does not go on the scenery but only on the tape.

#### GLOSSY SURFACES:

In the beginning of our experimentation, glossy surfaces were next to impossible to televise. We generally painted them out with flat paint, causing an unpleasing result for both color and black and white. Through careful lighting and new devices, such as large ceiling filters used in lighting automobiles and using reflected light for lighting of chromium products, we have been able to get natural results. Interchemical Corporation has developed a flattening agent for us that we do use when necessary. It is now only in the extreme cases if we cannot handle it with proper lighting that we take down a glossy surface.

#### LIGHTING:

The most important thing we have learned in lighting for color television is that the designer, lighting director and video man must work as a team.

The color system is extremely sensitive to small changes in light and is subject to other conditions which make it very difficult at any particular point to say that "this is the way a particular color will appear on the monitor." For this reason a designer must, to the best of his ability, analyze carefully the factors which affect a color and resist to a great extent both his own initial desire and the urging of others to repaint sets of areas prematurely, or make drastic costume changes which do not appear to be correct. Almost invariably the scenery and costumes are seen for the first time on camera before lighting has been completed, or while cameras and/or monitors have not been balanced; and the immediate urge is to repaint -- only to find upon completion of the lighting that the original colors would have been better.



We have successfully used color gelatins in many of our productions. Naturally this means more to the color audience than it does to the black and white. However, when we are in full color, the use of color gelatins will be a major factor in changing the look of a scene. This in itself will save a great deal of money and give us greater variety than presently experienced in black and white.

### COSTUMES:

The costumes for color television, more than any other item, are completely dependent upon the scenery and lighting used for the production. Colors that in themselves might be acceptable, may become a problem when exposed to the variable conditions that are imposed by the change of scenic and lighting elements.

There are certain colors to be avoided from the beginning -- colors that under almost any conditions will create difficulty: White, of course. High shades of yellow. Very high shades of green, such as pale chartreuse which has a great deal of yellow in it. Also very pale pinks when used in conjunction with dark backgrounds.

Depending of course on the color of the scenery needed to create a harmonious picture, the best colors lie in a range of the middle values. The reds -- varying from a shade above wine to a bright scarlet or a shocking pink -- will not be a problem. The greens -- ranging from a dark hunter green to an apple green -- will also remain fairly stable. Browns may be a problem because the dye may contain (depending on the shade) a great quantity of red that the camera may bring out. The same may be true of blue. A shade of blue that may appear to the eye as a true sapphire will take on a very green cast on camera because of the amount of yellow used in the dye. This may not be visible to the eye, but it may be picked up by the color system. Printed fabrics (unless the print is very clearly designed) may prove a total loss because the soft shaded prints have a tendency to run together. Only in a very tight closeup will definition be maintained. Textured fabrics usually show to great advantage. Nubby textures such as tweed, faille or various novelty weaves, brocades, etc., usually show to great effect. Pile fabrics such as velvet, cut velvet, mohair and flecked fabrics are extremely interesting. Sequin gowns can be used if the sequins are not solid and have at least  $\frac{1}{2}$  inch separation between sequins. Jewelry of all kinds can generally be used.

We have also found that most costumes available for renting from the costume houses were originally designed for the theatre. About 50% of these are in bright, full color and cannot be used effectively on color TV without some alteration and dyeing.

The greatest increase in color television cost has appeared in this area and will continue for some years to come, even if we decide to manufacture our own costumes. We are now contemplating the possibility of going into the manufacturing of our own costumes for color, if it should prove to be a savings to Management.



COMMERCIAL PACKAGES:

Considerable experimentation has been directed toward accurate color reproduction of commercial products. It is now apparent that most products do not require color correction. An accurate color reproduction of a product can be achieved by controlling the environment surrounding the product. If the product is very light in all-over value, a similar light background will help to hold true color. If the product is an all-over dark in value, again a similar value of background is suggested. It is important however, that there be enough contrast between the product and the background to create dimension and clarity. If the product colors do not reproduce accurately or bleed into each other once the background is established, it is then apparent that the product design is registering too much contrast. Lighting permits unlimited possibilities of value adjustments and can be used as an adjustment factor.

Many products have a high gloss surface which reflect studio light. If the product is to be handled by an actor or demonstrator and moved from a fixed position, it is often necessary to spray this product with a flattening agent. However, when such products are demonstrated in a fixed position, we are able to handle it through proper lighting and not use flattening agent. Many products may be too light in value, such as products with a white background. These can be sprayed with a warm gray water paint.

Since September, when sponsors bought color shows, we have had products ranging from automobiles to all types of glossy household appliances to cope with. I am happy to say that in every case we have shown the product successfully in full color and to the satisfaction of the client.

FUTURE COLOR TV COMMERCIALS:

Looking forward to the time when we are in full color, I have offered this long-reaching plan in the producing of color commercials. It is in line with Mr. Weaver's thinking of magazine concept. The cost of color commercials will continue to rise as the sponsors become more critical in the presentation of their products. Since they are already spending a great deal of monies in TV, film and national magazine publications, it is conceivable that with color TV one of the three mediums could suffer. If, however, the agencies took all of their art dollars and put them into one production fund -- and NBC would create a color commercial studio or studios (this could be in Chicago or any other commerce center; our programming would still originate on the West Coast and New York) -- then these art dollars (in one production) could create visual presentations for color television, color film and national publications as well. It is conceivable that under such a plan the art dollars spent today in black and white TV film and national publications would not increase measurably by the adding of color television. This still would allow greater visual impact for national coverage. It would also physically separate for NBC the editorial or programming from commercials; getting us closer to magazine concept.



GRAPHIC ARTS



## DEVELOPMENT OF N.B.C. GRAPHIC ART FOR COLOR TELEVISION

### INTRODUCTION:

The success of all Graphic Art for television, whether it be black and white or color, is accomplished through simplicity. It is this simplicity that creates impact and demands readability when a minimum of color and directness of design is used.

Black and white television serves as a perfect training for color, since we learned a great deal about value contrasts. This knowledge applied to color can be the key to the preparation of art for the new color system. It is value contrast which makes the RCA Color System compatible -- for if your colors are in contrast, your black and white picture (in most every case) will be compatible from the standpoint of art work.

Although the system has a tendency to exaggerate color, this exaggeration can be controlled through the proper selection of values. Such selection is now being done by persons who have had the opportunity to work with the color system, learning its peculiarities with its variables.

The selection of colors and their values is also dependent upon the subject. This is true of all color when used properly and seems apparent that it will be in the case of color television. A soap would suggest clean, cool colors -- an ad or illustration directed towards children viewers would undoubtedly be more effective with a selection of bright and warm colors. We will go into greater detail as to background color and its effects on subject later in this report.

Most of the Graphic Art prepared for color television is usually presented on a flat surface, making the lighting of such art less critical. This is important since Graphic Art must work in small areas and move frequently.

### PROGRESS OF GRAPHIC ART IN COLOR:

Unlike the Department of Make-up, which had 2½ to 3 years of experimentation during the growth of color, the Graphic Art Department entered this field only 16 months ago. Consequently, many standards are still being set and will continue to change as we learn more about the medium. However, it has proven in this area as well as in Design, Costume, Make-up, etc. that the added demands of color stimulate the creative aspects of these departments.

### PHOTOGRAPHY:

Photography and photostating saved the artist many hours in the preparation of daily art needs for black and white TV programming. When there was a need for a hurried picture of a product or of a place (say Times Square), we would turn to a photograph as an efficient time-saver. Unfortunately, color photography is not as functional. In the first place, a great deal of time is required to process color; it is costly; and most processes do not offer



true color. One color may hold but it is difficult to reproduce several colors accurately with present photographic processes. In many instances this is not important. However, in the photographic reproduction of a product, it is important that each color on the product remain true as the color message is as important as the spoken word. It is very possible that we will have to put in our own photo lab to take care of the value of work that will be required of us in this area. This would give quality control as well as an answer to the time problem. However, the costs will always be high.

#### SLIDES:

Of the processes experimented with by the New York Graphic Art Department, 2x2 slides of Ektachrome film are best for speed of development and costs. The 2x2 slides are projected through the color slide scanner, thus freeing a camera for preparation of the next position. Recently, a new slide cartridge has been developed for the color slide scanner so that a long horizontal slide can feed several frames or messages in rapid succession. Heretofore, we were forced to either go to black after each projected slide, or alternate slides with live camera. Our New York color photographic services have been able to prepare a series of horizontal frames on one strip of Ektachrome mounted between glass. The art must be prepared as a horizontal series of continuous frames for photographing. To date, we have been able to photograph as many as six horizontal frames for preparation of one horizontal slide, thus obtaining six separate messages for rapid televising. This form of slide preparation will enable a station to work with one slide scanner until such time as new slide scanning equipment is developed. This new equipment would allow dissolving from one slide to another without going to black screen or live camera.

The processing of single 2x2 slides on Ektachrome can be accomplished in eight to ten hours by New York color photographic services. Eastman Kodak processing requires several days. It is important that special attention be given to the slide masking as there is a difference between the color and the black and white monitor screens. Color slides for TV should be slightly more intense than normal exposure.

#### TELOPS:

We have been able to develop a fairly inexpensive process of dye transfer photography with an outside source. This allows us to have color telops in volume at a cost close to that of present black and white. Engineering was presented the problem of using color telops in the system and now has a feasible method of transmitting this information by using the 3-Vidicon Color Film Re-production System. When we are in full color, being able to transmit color telops will be a great savings to N.B.C. and its affiliate stations. It also allows us to have truer color than the use of slides. We are unable to correct the art work on a color slide if it is wrong; but in the case of color telops, we can make corrections.



### TRANSPARENCIES:

In several instances 8 x 10 color transparencies have been used successfully if mounted in front of an opal glass with back lighting. It is important that the transparency have a limited value range. Large areas of light values can cause glare and all colors become considerably darker.

### FLEXOCHROME:

Some success has been achieved with the use of Flexochrome. This is a hand coloring process using special chemicals on a prepared black and white print. The chemicals transpose the black and white into color. The Flexochrome process is time consuming but less costly than dye transfer prints.

There is definite need in this area for further development in color photography. In the meantime, the artist must illustrate ideas and render products that are to be seen by the camera or slide scanner by means of art work.

### SUPERIMPOSITION:

The technique of superimposition is being utilized but with no great success in color programming. One color can be superimposed over another; however there is a loss in color purity and clarity. It is recommended that white lettering be used for supering and prepared on a black background. Preparation of such art is exactly as in black and white. More experimentation is needed in this area. We have recently used the electronic wipe to great advantage both in commercial presentation and opening formats of art work.

### COLOR IDENT:

We have been working for some time on a standard form of art work or possibly an electronic color bar to be used as an identification preceding each of our color shows. Regardless of what form the art work ident takes, it would allow us to publish the above in full color print for distribution to all RCA home receiver owners. With this information, the operator at home could have a visual reference for adjusting his color receiver before each program.

### HOT PRESS:

The Hot Press Printing method can be adapted easily to printing titles, crawls and messages in color. With the use of color roll leaf, printing on colored stock, this process requires no more time than in black and white. There is a large variety of colors available in both hot press roll leaf and various papers and boards.

### ART MATERIALS:

The use of art materials is always optional. However, it appears that surfaces with a slight texture eliminate reflection from strong lighting. There are many sources for purchase of textured colored stock. Wallpapers have been used successfully for crawls. Nevertheless, the manufacturers have not supplied us with a sufficient variety of colors in crawl paper. We hope that in the near



future they will be able to meet our requirements. Transparent colors, i.e. water colors and inks, have a tendency to "wash out" on the color system. This is caused by the strong studio lighting on the art work which cuts through the rendering. Opaque, flat colors are recommended. Winsor and Newton Designers' Colors and Shiva Colors are used in the New York Graphic Art Department.

Color-aid papers are purchased in a wide variety of colors and can be cut and pasted up for hurried presentations of a simple design. Letters and numbers can be cut from this type of color stock as a means of quickly preparing visual messages.

#### COMMERCIAL PRODUCTS:

Considerable experimentation has been directed toward accurate color reproduction of commercial products. It is now apparent that most products do not require color correction. An accurate color reproduction of a product can be achieved by controlling the background color surrounding the product. This has been covered in the Scenic Design Section of this report.

#### SUGGESTIONS FOR ONE-CAMERA AND SLIDE SCANNER OPERATION:

1. Station identifications, shared identifications, twenty and thirty second spot sales and promotional art can be presented with the use of the multi-frame slide and scanner. All messages must be pre-planned so that they can be rendered as one unit or series of frames and photographed as a unit. Time must be allowed for color processing of the film and preparation of the slide.
2. Flip cards rendered in color can relate several messages as in a black and white operation. Cards can be flipped, pulled or turned manually on live camera.
3. Crawls or pan-boards, both horizontal and vertical, can be utilized in color also. Here is an example of the use of color Hot Press Printing.
4. Superimposition in color can be achieved in a one-camera operation with the use of the slide scanner. The camera can relate live art or action and a message can be superimposed over it by use of a slide, as the scanner serves as a second camera. Slides can be prepared in black and white or color for supering.
5. All types of gimmicks can be designed and constructed to substitute for normal multi-camera operation. Large color chips with cut-outs and rear-sliding moveable panels make interesting background for live commercials and product displays. Some success has been achieved with the use of sliding panels of plexiglass or glass with lettered messages. These operate in front of live action or displays. Hand lettering on glass has been used for zoom-in titling over live action; thus creating the effect of superimposition in color. Cut-out lettering covered with thin colored paper can spell out messages in color when using back lighting and pull tabs. The color of the paper covering the cut-out letters will determine the color of the light-up messages. Kaleidoscopic effects can be created with



the use of polaroid sheets or mirrors, but a single construction of moveable panels of plexiglass with paste-ups of Burgess-papers make an interesting color display.

VISTASCOPE:

Unfortunately, due to union jurisdictional conflicts, we have not been able to use the Vistascope to its complete advantage. From the experience gained in black and white television, we are sure that the Vistascope could be a great asset to color television. This instrument is a mat processing device into which art work is inserted. Certain areas of the art work are cut away so the matching subject in the studio can be seen through the cut-out area. This makes a composite of the art material and the live subject, giving great vistas of scenery without actually using scenery.

The instrument is composed of a series of lenses that allows great flexibility for use in studio operation. By using the Vistascope, it should be possible to take color magazine ads and, through proper planning, make these ads come to life.

SUMMARY:

Good graphic artists will be a must to local stations as well as the networks. It must also be remembered that since the art work prepared by these artists is much more critical and time consuming than the same type of work for black and white, the cost factor will increase. The networks will be affected more than the local stations because of the volume, but the local stations must be prepared to pay more for this service than in the past. A rough guesstimate would be a 75% to 100% increase in man hours only -- costs for material would remain substantially the same.