THE LIGHT BLEACHING QUESTIONNAIRE

The following is a copy of the light bleaching questionnaire which was sent to a group of people who had expressed an interest in comparing light bleaching treatments at the Philadelphia AIC meeting in 1981. As I explained at the Milwaukee AIC meeting, the response was limited and therefore I hesitate to draw any conclusions from the data which was gathered. If anyone wishes to continue to characterize the nature of their bleaching techniques in the future, I will be happy to collect, organize and report on any information which is sent to me.

I believe that the form might be improved or even completely redone. It was created in order to more easily compare different light bleaching techniques being used around the country. Questions have been raised about the use of a light meter to measure light intensities. It is an imperfect instrument for this application, but it is a tool which most conservators already own and therefore was thought to be the most practical choice for the purposes of this questionnaire. It was hoped that with a common form and a large enough response that we could evaluate the effectiveness of various techniques. Of course, the chemistry of light bleaching is outside the scope of this form. Whether the light bleaching is beneficial or degradative to the molecular structure of paper and its media will require careful scientific investigation.

Many people expressed an interest in continuing to work with a light bleaching questionnaire. I am open to any suggestions if you feel that further data of this sort might be useful. Please contact me at:

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Top space: NAME and ADDRESS

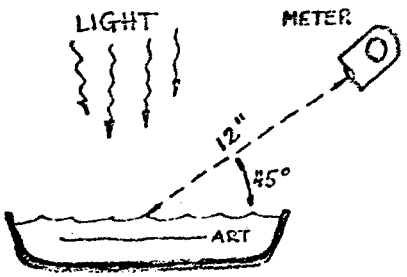
Artist, title, date: date refers to approximate date of artwork.

PAPER:-The "0" before each category refers to the condition before treatment, while the "0" after each category refers to the condition after treatment. Check the appropriate "0".
-Chem. wp and Mech. wp refer to chemical and mechanical woodpulp paper. Keiko Keyes has not recommended sun bleaching for groundwood papers, however, if you would like to do some experimenting, here is the "0" for you.

STAIN:-The number before each stain condition in the first column is to be placed next to its corresponding color before and after treatment in the second column. I notice that we have made no provision for a "reddish" stain before treatment to become a "LIGHT reddish" stain after treatment. Hmmmm... This is where "descriptive remarks" are going to have to be used. Likewise for all the other categories.
-The "number on the Kodak 10-square gray scale ... (w=white=1, b=black=10)" is an attempt to get us to use the same language to describe a stain. It is a bit difficult to match a brown foxing stain to a gray color scale, however, I tested 5 people in the lab and found that we were all pretty close in our estimate of the tonal value of the stain in direct comparison with the scale. I think that we can describe the stain as being between 2-3 on the gray scale, for example, and still feel that we have a more definite description of the stain than if we have only described it as "light foxing".

METHOD:-"b.t. and a.t." refer to before and after treatment, respectively.
-"covering fogged" is the condition seen when the plexi or glass fogs up when you are bleaching. Some people have more trouble with this than others. Spacers between the pan and the glass help, but this can be a problem if it is windy and the glass is not held down.

EXPOSURE:-"FC reading toward object, 45° angle, 12"on diagonal, during bleaching" is described pictorially below. If we keep the angle at which we take the reading and the distance from the paper constant, hopfully we can eliminate two variables which influence light meter readings---we are still going to have a great deal of error in our readings even keeping these two factors constant. I do not know whether this reading will be at all useful to us. About all it can do is indicate to us if we get a very low FC reading by comparison to the FC reading taken off of our source that our paper is very dark either due to media or severe staining. Maybe this reading needs to be compared to a reflected reading taken off of a gray card? I do not know...does anyone have any ideas? (FC=footcandle)



EXPOSURE continued:

-The FC reading toward the light source, i.e. incident-light reading, should be taken with the diffuser in place.

-"FC (average)" is the average of the two FC readings taken during treatment, times the number of hours of exposure which should equal the footcandle hours of exposure.

Examples:

1600 FC x 2 hours = 3200 FC hours of exposure

1600 FC x ½ hour = 800 FC hours of exposure

-"light meter" refers to the type of light meter which you are using i.e. the brand name, and whether it is a selenium cell or cadmium sulfide cell. It should tell you in the instruction book.

-The FC reading on the artificial light source should be taken at the same distance as the bath surface is from the lights.

afterthought (1st of many!): Feel free to characterize stains by more than one check-off, e.g.: pale reddish brown (which could be before treatment, and pale grayish brown could be after treatment).

SUN BLEACHING

artist _____ title _____ date _____ media _____

PAPER
- 0 white 0
- 0 off-white 0
- 0 cream 0
- 0 tan 0
- 0 brown 0
- 0 colored 0 _____

- 0 rag
- 0 chem.wp
- 0 mech.wp
- 0 other _____

- 0 card
- 0 thick
- 0 medium
- 0 thin
- 0 tissue
- 0 other _____

- 0 normal for weight
- 0 weakened
- 0 brittle
- 0 pulpy
- 0 other _____

watermark and/or markings

STAIN
- 1 0 overall 0
- 2 0 mat burn 0
- 3 0 margins 0
- 4 0 liquid 0
- 5 0 foxing 0
- 6 0 adhesive 0 _____
- 7 0 tape 0 _____
- 8 0 other 0 _____

- 0 pale brown 0
- 0 intense brown 0
- 0 dark brown 0
- 0 grayish 0
- 0 yellowish 0
- 0 reddish 0
- 0 greenish 0
- 0 bluish 0
- 0 colored _____
- stain removed 0

number on Kodak 10-square gray scale of comparative tonal value (w=1, b=10) _____

descriptive remarks

METHOD solution 0 tap water 0 filtered 0 deionized 0 distilled

buffer _____

solution strength _____

temp. b.t._____ a.t._____

pH b.t._____ a.t._____

pan color_____

pan covering 0 glass 0 plexi type_____ 0 mylar 0 none 0 none, but process carried out under skylight or window

0 covering fogged?

0 immersed

depth of solution above paper _____

0 floated

0 encapsulated

0 other_____

EXPOSURE date_____ time in_____ time out_____

air temp. b.t._____ a.t._____

light meter_____

FC reading toward object, 45° angle, 12" on diag., during bleaching _____

FC toward light source b.t._____ a.t._____

FC (average) _____ x hours _____ = FC hours _____

sky
- 0 bright blue 0
- 0 clear 0
- 0 hazy 0
- 0 gray 0
- 0 scattered cld. 0
- 0 high thin cld. 0
- 0 high overcast 0
- 0 polluted 0

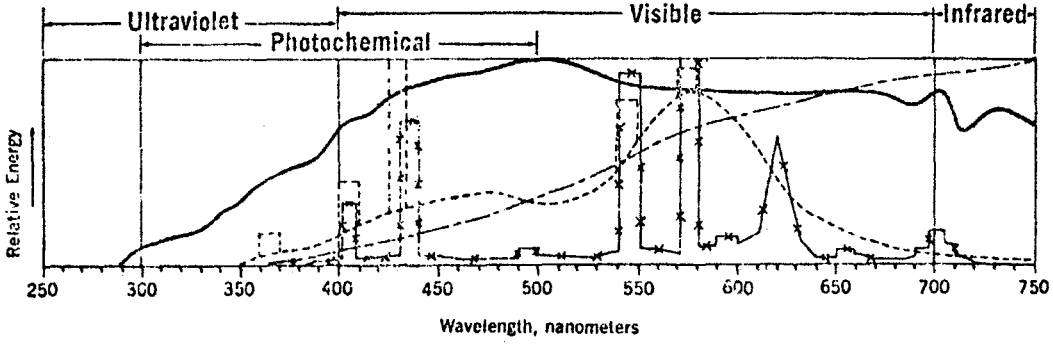
artificial light source (characterize by type and number)

distance from bath surface_____

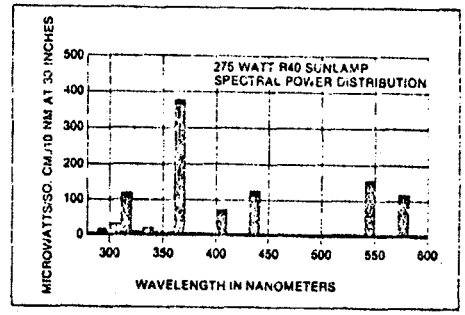
remarks

GENERAL REMARKS

SPECTRAL DISTRIBUTIONS OF VARIOUS LIGHT SOURCES



Sylvania 275-w sunlamp:



Sunlight
Cool White Fluorescent Lamp
3200°K Tungsten Filament Lamp
Deluxe White Mercury Lamp

Above from a Plexiglass Industry publication

Below and to the right from Thomson, The Museum Environment

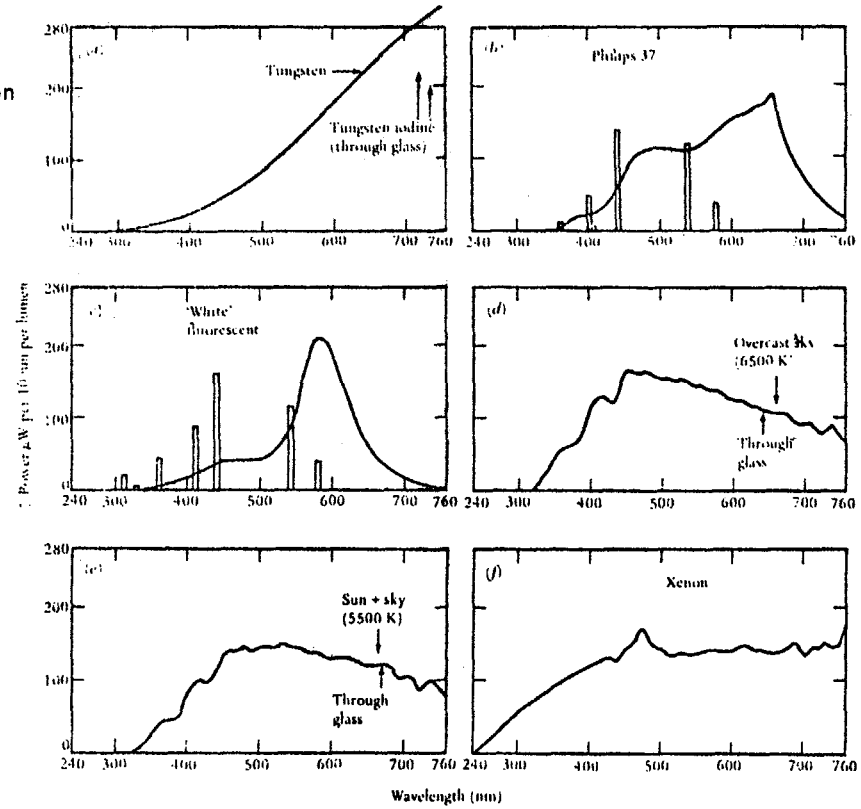


Figure 60
Spectral power distributions of some light sources in microwatts per 10 nm per lumen. *(a)* Black curve: Tungsten incandescent lamp (CIE Source A, 2854 K). Broken colour curve: Tungsten iodine lamp at 3360 K. Full colour curve: The same tungsten iodine lamp with glass shield. *(b)* Philips 37 fluorescent lamp. The continuous curve is of radiation from the phosphors. The vertical bars are of mercury radiation. For example, mercury radiation emitted by this lamp at 436 nm is 135 microwatts per lumen. *(c)* A 'White' fluorescent lamp. The concentration of radiation in the middle of the visible spectrum makes this lamp of high efficacy but poor colour rendering. *(d)* Colour curve: Radiation from an overcast sky at 6500 K. Black curve: The same through window glass. *(e)* Colour curve: Light from the sun and sky at 5500 K. Black curve: the same through window glass. *(f)* A typical xenon lamp. Note the considerable output of UV radiation. This necessitates the use of a UV-absorbing filter where museum objects are regularly photographed by (xenon) electronic flash. The lamp is too powerful for use inside the museum as a continuous source. If it were to be so used, one would advise both glass and a plastic UV-absorbing filter

Note. Numerical data and further details for all these curves are to be found in *Table 15*. This table also includes a metal halide lamp of good colour-rendering quality, the Osram HQI/L 250W. Data for this lamp were not available below 360 nm, but it can be seen that a UV-absorbing filter (though not glass) would be very necessary. Metal halide lamps are in process of development, and present products vary widely in performance