GRAINED VINYLITE AND THE MEDINA-LOONEY PROCESS

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During recent years the facilities and personnel of the U. S. Navy Hydrographic Office were subjected to repeated demands for ever-increasing production of vital strategic and operational charts and publications. As in many other cases, requirements never respected the known potential production of the establishment. Generally, it would at first appear that personnel and equipment could not be expanded in sufficient time or in adequate quantity to meet deadlines established by higher authority who, in the overall picture, could not and should not be forced to consider the minute production details of an admittedly essential item of war.

It can now be comfortably confessed that there were but two alternatives. Either the Hydrographic Office could fail in its basic obligation to furnish required charts in quantities and at times requested, or it could meet demands by increased ingenuity in the use of available machinery, personnel and materials. This is the story of just one case in which the Hydrographic Office fulfilled its obligations by the alertness and ability of its personnel to recognize and capitalize upon the possibilities of an available although untried material.

Vinylite is now an established material in the field of cartography. It is a stable plastic which has at least three qualities that make its continued use in this field assured, and which were the basis for the original interest in it by the Hydrographic Office. Its outstanding characteristic is a low co-efficient of expansion and contraction. Atmospheric conditions have essentially no effect upon the true scale of work compiled upon vinylite. In addition, it possesses a superior drafting surface of very fine grain, applied by the manufacturer, and lastly, it is translucent. Available in sheets which are pliable, easy access may be had to all sections of work thereon. To date, it has been used at the Hydrografic Office as the vehicle for drafting originals, photogrammetric compilations, and, in lithographic reproduction, it has served exceedingly well for intermediate phases of plate-making. Its recent removal from the list of restricted materials will enable surveyors and chart and map makers all over the world to avail themselves of the advantages which American cartographers have had at their disposal during the war years.

It is not claimed that the maximum usefulness of this material has been achieved ; however, it is of value to point out what has been accomplished and the manner in which it was done in order to facilitate and encourage other experiments and developments which may fully exhaust the flexibility and uses of a now proven product.

The evolution of uses for grained vinylite has followed no particular pattern. Its possibilities appealed to personnel engaged in many phases of chart production and reproduction. Over a period of time it has been used successfully as a drafting base, a vehicle for masks in preparation of land and water tint images, the creation of images for gradients of elevation, a vehicle for blueprints and assembly of overprint data, and as a final black and white original. Undoubtedly the greatest achievement made possible by grained vinylite was the development of the Medina-Looney Process, described later.

Although it is realized that other Government departments and commercial enterprises have carried on research and experiments with this material, the Hydrographic Office intensified its work in an effort to conserve manpower. On the basis of chemical formulas described in trade journals and elaboration and further experimenting thereupon, the Photographic Section of the Hydrographic Office succeeded in producing a stable photographic black and white print upon vinylite. This in turn made possible the further development of the process, wherein any portion of a subject can be made to appear in a permanent photographic black image and any other portion made to appear in a non-photographic blue image. This process is ideally suited for the preparation of new editions of topographic maps where the planimetry is being extensively revised from new aerial photographic

coverage. It eliminates the time-consuming necessity of re-drawing or re-tracing the contours. It is equally applicable to the revision of nautical charts ; particularly of those areas which require frequent editions due to the changing character of the hydrography. In most cases, the planimetric and topographic features are stable or require only minor changes. The process can be utilized to advantage in several phases of chart and map compilation and serves as an adequate and ingenious substitute for the generally accepted system of making such changes on existing originals. The true value and effectiveness of the process is given in the following description.

DESCRIPTION OF THE PROCESS

A piece of grained vinylite is cleaned of all surface dirt with water and pumice powder, placed in a whirler and coated with Pitman Blu-print solution. After thorough drying in the whirler, the sensitized plastic is placed in the vacuum printing frame and exposed to a negative under arc lamps. After exposure the plastic is placed under a tap of running water for developing. A complete image in blue results.

Using a marked photo-print made from the original negative as a guide, the features of the chart or map requiring revision are then marked on the vinylite positive with one of several available solutions. Following this, the plastic blueprint is placed in a tray of blue dye for about five minutes in order to give greater density to the positive image.

The next step is dipping the positive print in a tray containing a solution of potassium iodide and iodine which fixes the unmasked portion of the image, converting the blue to a dark brown image. This is followed by flowing the subject with a weak solution of ammonium hydroxide to clear the plastic of surface scum. In removing this scum, a resulting black image is obtained.

After this procedure is completed, the masking solution is removed with a solvent. (Experiments are now in progress which probably will replace the lampblack masking solution by a clear solution which need not be removed). The resulting print will be in two colors : black for the permanent features requiring no changes, such as contours, planimetry, etc., and blue for information requiring changes. This blue-black original may now be drafted in the regular way.

The following are the formulas used in carrying out the process :

FORMULAS AND PROCEDURES USED

"A" (Sensitizer).

Pitman's Bluprint Powder	4 ounces.
Hot water (140°)	32 »
Strong Ammonia	1 ounce.

Directions :

1. Slowly add 4 ounces Pitman's Bluprint Powder to 32 ounces of warm water, stirring vigorously. The water should not be over 140° F. After the powder is dissolved, 1 ounce of strong ammonia is added, after which the solution is allowed to cool before being filtered through cotton, this solution should test 26° specific gravity.

2. The plastic should be cleaned with pumice powder and water before using, and taped to a piece of zinc to hold it flat while in the whirler. The plastic is then coated with solution "A" at a whirler speed of between 30 and 40 R.P.M, care should be taken not to overheat the whirler, as too much heat will cause the plastic to buckle.

3. The correct printing time varies with the density of the coating and the distance of the arc lamp.

4. After exposure the print is placed under the tap and the water full force is played upon it ; when a trace of the image appears, development may be completed with cotton. One quarter ounce of strong ammonia to a quart of water will help to develop a stubborn print, but it should not be forced too strongly.

Blacking the Positive :

Formula "B" :

Methylene Blue Dye	½ ounce.
Water	1 gallon.

Formula "C"

Iodine resublimed	4 ounces.
Potassium Iodide	8 »
Water	20 »

Directions :

1. When the image is completely developed the plastic is placed in a solution of Methylene Blue (see solution *B*) for about 5 or 10 minutes.

2. The positive is then taken and washed thoroughly and immersed in a solution of iodine (see solution *C*).

3. After the iodine solution the positive has a brownish cast. To clean this use 1/4 ounce of Ammonia to 32 ounces of water and flow freely over the entire plastic ; after washing blot excess water and hang up to dry.