

A NEW METHOD FOR OBTAINING AN ORIGINAL FROM AN ENGRAVED COPPER PLATE

By A.G. OGDEN,
Head, Engraving Branch, U.S. Navy Hydrographic Office

Introduction

Ever since chart and map making agencies discontinued the printing of production copies directly from copper plate engravings in favor of the photolithographic process, it has been necessary to print reproduction « originals » from existing engravings. These originals can be corrected and can have further data added before being photographed to obtain a negative from which the lithographic plate is made. It has been a paramount desire to attain in such originals the dimensional stability, exactness, and fine detail of the copper plate engravings.

Several non-photographic methods have recently been developed in other countries for transferring from copper plate engravings to plastic drafting media. But now, as the result of investigations to find a method particularly suited to the needs and facilities of the U.S. Navy Hydrographic Office, there has been developed a process believed to hold great promise. To present the problem and its solution by this process in a comprehensive manner, it is considered advisable to first review the old and universally recognized method for obtaining an original from an engraved copper plate.

Old Method

In producing an original by the old method, it was necessary to utilize three different types of paper, i.e., unsensitized « raw stock » photographic paper, thin mapping paper, and thick lintless blotting paper. Advance preparation consisted of coating one side of both the stock and thin mapping paper with liquid paste and allowing it to dry.

When an impression was to be made from an engraved copper plate for an original, the plate was inked in; a sheet of prepared raw stock, slightly dampened with water and alcohol, was placed with paste-side up over the plate and covered with a sheet of lintless blotting paper. In traveling between the steel rollers and the wool blanket of a flat bed press, the impression was made and the raw stock and blotting paper were fused together. After drying, a moistened sheet of prepared thin map paper was fused to the reverse (blotting paper) side of the original by running the two through the press, protecting the previously printed surface of the original with a clean sheet of map paper.

It is readily apparent that the application of liquid paste, wetting for fusing, and subsequent drying caused considerable distortion in the original due to hygroscopic expansion and contraction. Especially undesirable was the fact that this distortion was never equal in both directions. Further differential distortions due to atmospheric changes were usually experienced while drafting corrections and additions on the original. Thus « mounted » paper has never proven fully satisfactory for originals to be photographed for lithographic reproduction.

New Method.

Recently at the U.S. Navy Hydrographic Office, a dimensionally stable original, on a plastic medium, has been successfully produced by a special process based on direct photography of the engraved copper plate. Not only is the original dimensionally stable; but also, incorrect or obsolete data can be easily opaqued on the intermediate negative required in the process, facilitating the drafting and « stick-up » corrections and additions to be made on the resulting original. Furthermore, the fine quality line work of the engraving is retained throughout the process and is reflected in the better quality of the lithographed reproduction copies.

This new method is accomplished as follows :

1. The engraved copper plate is first cleaned and highly polished, freed from all surface scratches, and buffing marks are removed.

2. The engraving is then inked-in by the same procedures ordinarily employed for plate printing, except that a white opaque lithographic ink is used. As the lithographic ink is considerably more tacky than plate printer's ink, a little more effort than normal is required to wipe the plate free of surplus surface ink. Also, the printer must use whiting powder in a different manner. Rather than applying a small amount of ink to his hands to make the whiting stick to his hands for manual polishing of the plate, he scatters about three ounces of powdered whiting on the plate after it has been wiped clear of surface ink with clean bleached cheesecloth. Then he uses another clean piece of cheesecloth to remove the whiting. In doing so, the grease of the ink, as well as all surface ink, is removed, giving the copper plate a highly polished appearance with the white ink showing in the engraving.

3. The surface of the copper plate is then stained to a uniform light brown color by exposure to the fumes of ammonium sulfide. This is accomplished by saturating a 6 inch \times 10 inch piece of lintless blotter with ammonium sulfide solution and passing it rapidly over the copper plate at a distance of about six inches from the plate. About three minutes are required to attain the desired light brown color. The whole process up to this point takes about twenty-five minutes.

4. The copper plate is tacked securely to a mounting board so that it will be perfectly flat. After the mounted plate is attached to the copy board of the copying camera, it is photographed on a glass wet plate. The resulting photograph will be a *positive* since the white-filled engraving will produce black lines on the glass wet plate. Controlling size and processing the wet plate are standard procedures, except that the photographer must remember that he is working on a positive rather than a negative. He must keep in mind when cutting with cyanide and iodine that the image sharpens (lines become thinner) rather than thickens, as he is accustomed to when cutting on a negative.

5. Next, a contact negative is made from the wet plate positive. This negative is made on a sensitized transparent plastic. Detail to be eliminated is opaqued on this dimensionally stable negative.

6. Finally, a contact positive is made on a sensitized sheet of opaque white plastic, which is also dimensionally stable. This plastic is sensitized by coating in a lithographic plate-coater (whirler) with a « water coat jet black » solution. After exposure to a strong arc light, it is developed in the same manner as an albumin lithographic plate.

By precise dimension control in photographing from copper plate to glass wet plate, then contact printing on stable bases, not only can accurate scale be maintained throughout the process, but differential distortion is eliminated except for that negligible amount found in the plastics used. Thus the originals produced from copper plate engravings by this process are far superior to any heretofore attainable by the U.S. Navy Hydrographic Office.
