

NEW CHART REPRODUCTION METHODS OF ITALIAN NAVY HYDROGRAPHIC INSTITUTE

The increasing need for a higher rate and standard of chart production has led to the adoption of new methods and materials in the drawing and photo-processing of charts.

The introduction of modern methods has speeded up the compilation of the drawing stage, as well as reproduction, resulting in obvious advantages as regards both the issuance and correction of charts, and in savings of equipment and personnel.

In order that these advantages may be clearly brought out, deriving from technical procedures previously reported in the *International Hydrographic Review*, both the old and new methods used in compiling a chart on the scale of 1:100 000 in the new Italian coastal series will be described, illustrated by the accompanying diagrams.

An outline of both processes will be given on the assumption that chart compilation is effected from features deriving from the largest-scale charts subjected to suitable photographic reduction, and that such copies are obtained from lithographic or copper originals (copper originals being available to most hydrographic establishments in large amounts).

Old Process.

After establishing the limits of the chart and plotting the points of the known coordinates on the grid, a photographic reduction is made, on the desired scale, of the copperplate and lithographic prints showing the areas between such limits.

The difficulty of reducing the copperplate impression to exact size becomes readily apparent at this stage, since owing to the wetting process it must be subjected to for reproduction purposes, an uneven distortion in the length in proportion to the width occurs, with the result that an irreducible distortion subsists on the negative.

From the negative, which is prepared with collodion, the zinc plates are obtained by a simple lithographic method, and the reduced copy is printed on dimensionally stable paper. The points of the trigonometry are then made to coincide with those previously plotted on the grid, and a mosaic is obtained. A further difficulty then arises: as we have already mentioned, the reductions originating from the copperplate impression were subjected to distortion, and as a result they cannot be made to coincide exactly with the points on the grid. The reduced copy must therefore be broken up so that accuracy of the points can be maintained, with consequent detriment to the topography, which then becomes approximate and shows lack of continuity.

The mosaic so laboriously contrived is photographed, and a zinc plate is prepared for printing a non-actinic blue reproduction of the mosaic on glazed drawing paper.

New Process.

After obtaining a negative plate of the lithographed prints by photographic transfer at the exact size through use of the known coordinate points plotted on a dimensionally stable grid, a positive print is obtained from the plate by contact on a plastic sheet.

The copperplate impressions are not photographed, the copper plates themselves being photographed directly.

The copper plate is coated with zinc oxide or talcum powder for this purpose, in such a way as to fill the smallest details of the engraving.

The wet collodion plate negative is developed according to a special formula, and after drying is coated with gum and collodion.

Since the lines on the copper plate are white, the dimensionally stable glass plate will come out as a positive.

By the « reversal » process (a positive obtained from a positive), the positive image is transferred to the plastic sheet. In this way, whether they originate from copperplate engravings or lithographic prints, chart images are obtained on various dimensionally stable materials, are free from distortion, and are reproduced at the required scale.

The technical draftsman prepares the grid on another transparent plastic sheet, and traces the various sections directly upon the latter as in the reproduction of ordinary drawings.

Once the drawing has been prepared, contact-proofs required for revision can be obtained by the helio process. Corrections to the plastic sheet can be made directly by scraping.

After correction, a blue-line print is reproduced on opaque plastic, on which the artist's work is carried out. Lettering, soundings, etc., are printed on cellophane, cut out, and stuck to the plastic sheet by means of an adhesive wax substance.

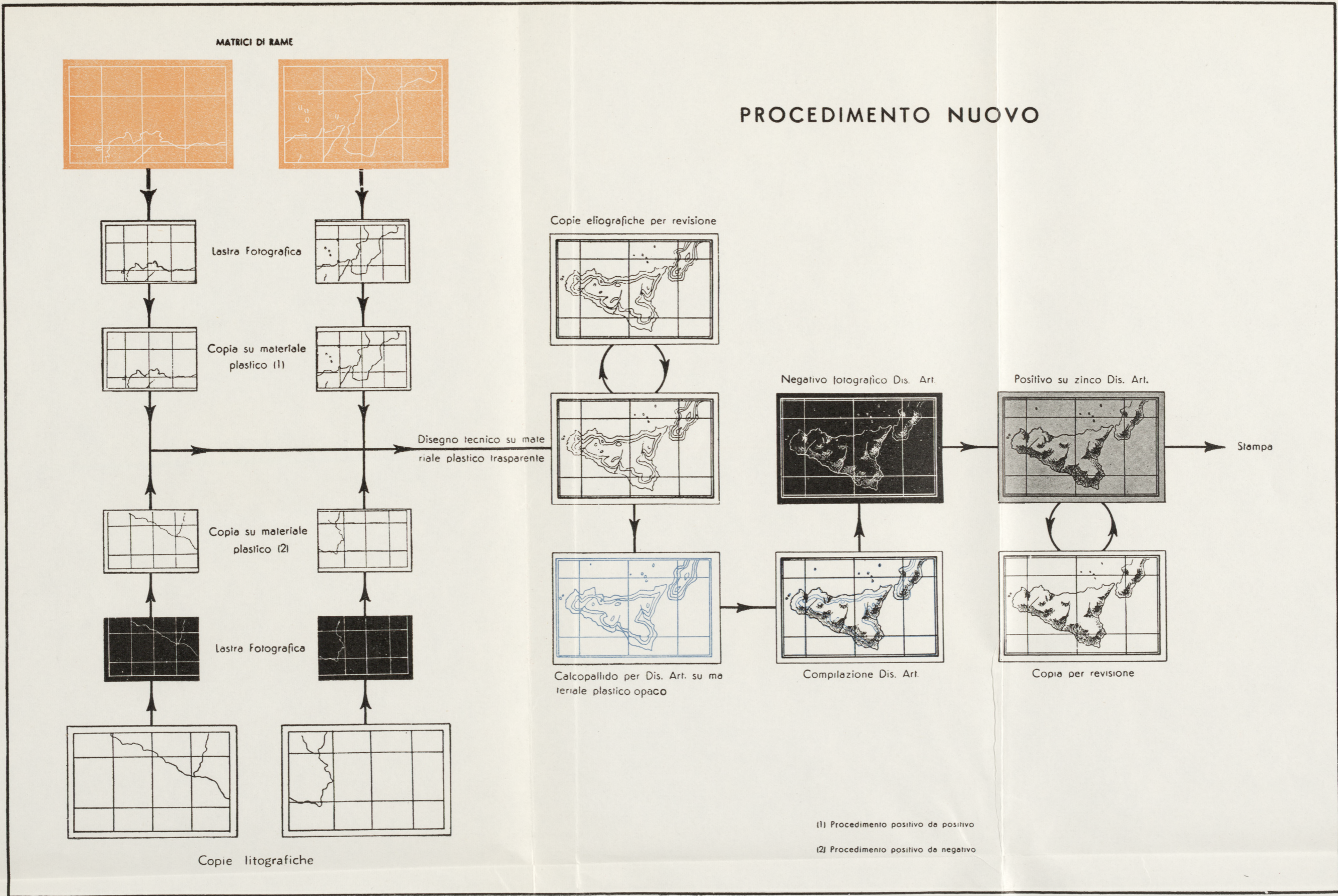
Following completion of the artistic and technical drawing, a reproduction is made by ordinary photolithographic methods.

If several colours are used for the chart, a blue-line print is made for each colour, and the drawing may then be worked upon simultaneously by an increased number of draftsmen.

The new process offers the following advantages :

— Direct photography of the copper plate enables absolute accuracy to be obtained upon reduction of the original chart. This would be impossible if the chart itself were photographed, since distortions are not linear and cannot be adjusted precisely along the orthogonal axes.

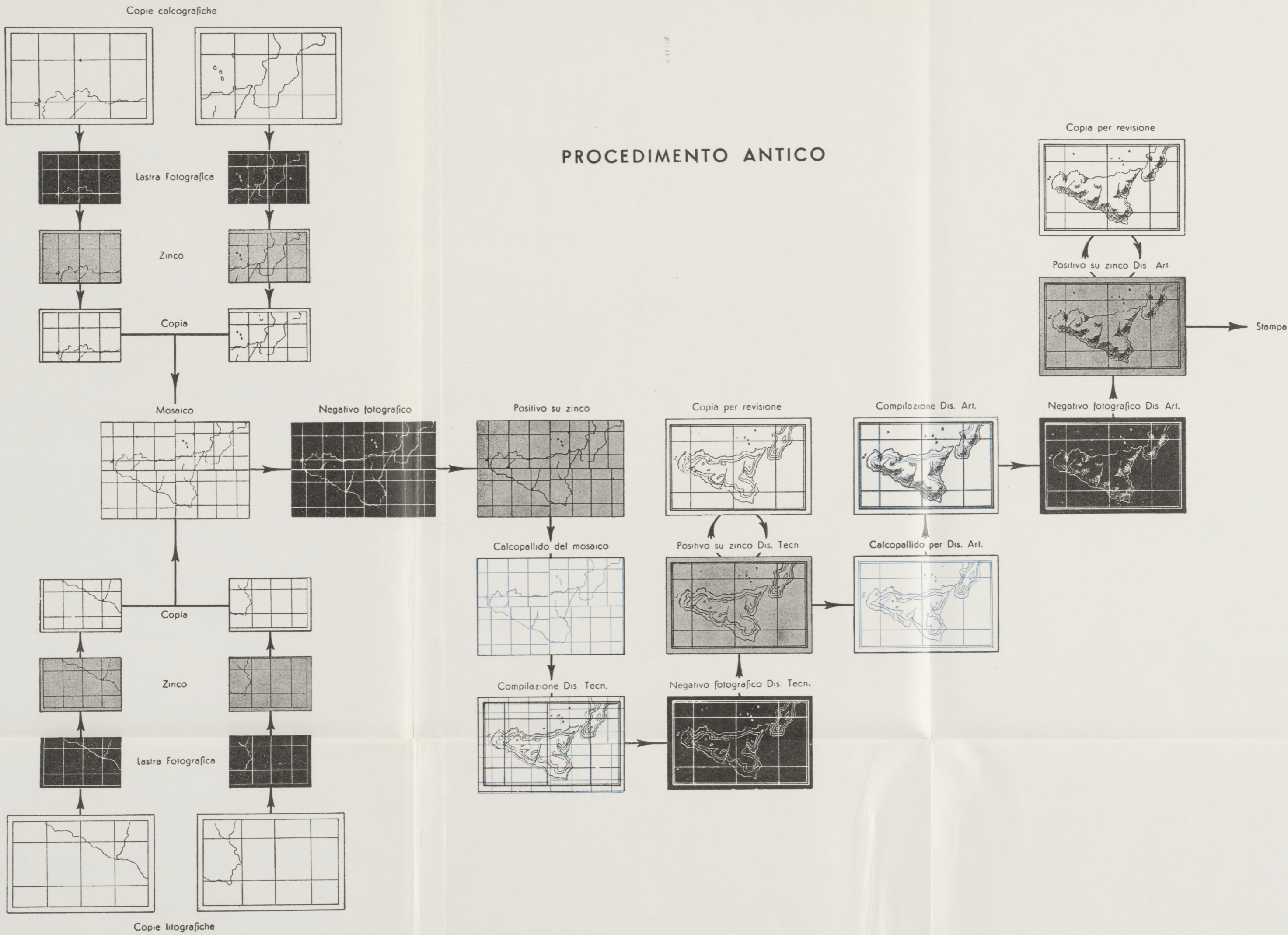
— Assembling of the mosaic is avoided, as the various features making up the chart can be traced directly by using transparent plastic.



NEW PROCESS. — Copper plates - Photographic plate - Print on plastic (1) - Litho originals - Photographic plate - Print on plastic (2) - Technical drawing on transparent plastic - Heliographic correction copy - Blue-line print on opaque plastic for artist's drawing - Compilation of artist's drawing - Photo negative of artist's drawing - Zinc positive of artist's drawing - Printing - Correction copy.

(1) Positive-from-positive process.
 (2) Positive-from-negative process.

PROCEDIMENTO ANTICO



OLD PROCESS. — Litho Copper originals: - Photographic plate - Zinc plate - Print - Mosaic - Photo negative - Zinc positive - Blue-line print of mosaic - Compilation of technical drawing - Photo negative of technical drawing - Zinc positive of technical drawing - Correction copy - Blue-line print for artist's drawing - Compilation of artist's drawing - Photo negative of artist's drawing - Zinc positive of artist's drawing - Printing - Correction copy.

— The obtaining of a blue-line print by contact reproduction obviates many of the operational stages; moreover, helio prints may be obtained directly from the original technical drawing on a transparent base for correction purposes, thus eliminating the need for zinc plate preparation.

In addition to increasing the speed of chart reproduction, charts are obtained having a higher standard of accuracy than in the past, owing to the dimensional stability of the plastic sheets and the possibility of reproducing drawings by transparency.

The qualities of speed and accuracy that now characterize surveying activities, due to the modern equipment of surveying vessels, are accordingly carried over into the chart reproduction stage.

Further satisfactory results have been obtained with plastic sheets that are coated with a thin layer of non-actinic varnish and can be engraved. The zinc plate can be printed directly from such a negative by the photolithographic process. The uniformity and fineness of line thus obtained, as well as speed of performance, favour use of this second method in certain cases.
