

PHOTO-ALUMINOGRAPHY.

This method produces a chart that conforms perfectly to a desired scale. In this process sheets of high-grade bristol board are similarly mounted on opposite sides of aluminium plate, allowing spaces between the several sheets. The mounting on both sides prevents buckling and insures a permanently flat working surface. The practice of constructing the complete projection and the junction lines of sections (in halves or quarters) of a large chart upon a single plate of paper-mounted aluminium, has served not only to secure scale maintenance, but has made it possible to cut the original plate into its joining sections and to distribute the work more economically.

Each section with adjoining junction lines repeated is provided with convenient margins in the original mounting. It is then compiled and, after verification, the several parts or sections are sent to another branch of the service for purposes of photographic transfer to glass negatives. The finished cartographic work is then done by one or several lithographic artists according to the speed required in making the chart ready for publication. The film sides of the negatives are given a coat of asphaltum which permits the compiler's drawing to be clearly seen but which destroys its printing qualities, thus enabling the artist to cut-in or engrave through the asphaltum and photographic emulsion the configuration and lettering in a standard degree of finish. In the next stage, on nautical charts, the soundings and bottom characteristics are cut-in by a sounding engraving machine.

After the negatives are cut they are process-printed and assembled on a sensitized grained aluminium plate. The usual long interval between surveys and their publication in chart form has thus been reduced to a minimum period of time in which the compiler and engraver have specialized in their individual fields.

By the new process of photo-aluminography the printed chart as it comes from the press is accurate in scale and free from distortion, but, in use, it will be found distorted to the amount that the paper upon which it is printed is later on affected by atmospheric conditions.

SELECTION OF SOUNDINGS

(Extract from *Cartography*, Special Publication No 205, U.S. Coast and Geodetic Survey, Washington. 1936).

It should be borne in mind that no feature of the chart is of more importance than the selection of soundings which will represent the hydrographic features properly and clearly. As the survey sheets are generally of a much larger scale than the chart, and each sounding line contains as many of the soundings as can be plotted thereon, it is obvious that the chart can show only a small percentage of the soundings. Moreover, it is objectionable to crowd the chart with unnecessary soundings which detract from its clearness and show only a lack of skill on the part of the cartographer.

Before selecting the soundings, the charting material should be studied thoroughly until the control, the plane of reference, the unit of soundings, and the dates of the surveys are clearly established, and a mental picture of the general characteristics of the locality has been acquired; otherwise an intelligible selection is impossible.

The soundings on shoals or rocks discovered with the wire-drag should be charted first in the compilation of a chart, and after such charting, previous surveys of the same area should be examined for less depths than the drag depths. A careful study should be made as to the source of such information, whether from a survey sheet or not, and its probable value for retention purposes. Then should follow the soundings that will bring out clearly all other shoals by their least depth. Subject to the foregoing, the soundings over areas completely developed should be shown fairly uniformly and without crowding.

The selection of channel soundings should be based on the line of maximum depths running with the channel. A hydrographic curve on the original sheet will generally serve this purpose. No pencil notations, lines, or marks should be made on the original survey sheets, and all preliminary studies should be made on tracing paper for transfer to the chart compilation.

If there are channel ranges, a line of soundings on the range should be selected, or suitable legend employed. After this is done, an intermediate temporary curve, if necessary, may be obtained from the original survey sheet which will serve to define the navigational limits for a

vessel whose draft approximates the controlling channel depth, and which will be an aid in filling in soundings within those limits. In general, the soundings should be more closely spaced in such areas than elsewhere, and it follows that any unnecessary sounding is more objectionable than it would be in other areas. Beyond these limits, after the channels have been developed and the shoals plotted, the selection for the rest of the chart depends on the physical characteristics of the bottom, so no hard-and-fast rules can be stated. If the slopes are gentle, it is simply a matter of as uniform a spacing as the surveys will permit.

If the bottom is undulating, consisting of a series of ridges and valleys, as on the New Jersey coast, a uniform selection, using the soundings of least depth will result in an erroneous representation. In such a case some of the deeper soundings should be shown, even if it necessitates a somewhat closer selection. If the bottom is rocky and broken, a uniformly spaced selection is impossible. The minimum depths must be shown, and then filled in with the deeper soundings between them, care being taken not to place a deep sounding so close to a danger as to tend to obscure it.

Soundings of the same depth as a curve, and placed close to or on the curve are of doubtful value and should be omitted.

Where larger-scale charts exist and the scale of a chart under construction is so small that channel depths cannot clearly be shown with standard-gage soundings, the soundings should be omitted, and the smaller the scale the more should the details be generalized. A legend, preferably printed in red, giving the chart number of local charts of the next larger scale should be supplied on the smaller scale series. This will encourage the use of larger scale charts where the smaller scales are inadequate in supplying necessary details.

If a recent survey shows greatly changed conditions where it joins an older survey, a junction should not be forced, but a blank space should be left with a suitable note beyond the limits of the more recent survey. In any case an "office survey" is to be avoided.

SHOALS AND DANGERS

Shoal spots should be clearly shown and nothing permitted to obscure the soundings.

Isolated shoal soundings, not definitely located by a survey should be accompanied by the abbreviations PD (*position doubtful*) or ED (*existence doubtful*), as indicated by the information.

The size of surrounding curves on the compilation should be exaggerated so that they will not touch the sounding figures, and, if it is a curve that is usually sanded, it should be drawn sufficiently distant from the sounding to allow for several rows of sand dots outside the sounding figure. This should be done on the compilation and not left to the draftsman making the smooth drawing nor to the engraver. Sand dots should not be placed within the numerals nor nearer to the body of any numeral or letter than the average space between dots. When the curves around shoals join, they should be generalized into one shoal. In interpreting the above, care must be taken not to close or seriously decrease the width of navigable channels.

A shoal sounding on an isolated rock should have the abbreviation *Rk* placed near it in upright or slanting letters accordingly as the rock is bare at high water or otherwise.

Soundings should be omitted or less frequent within the space covered by groups of rocks or coral heads through which there is no well-defined channel.

Islets, rocks, and rocks awash must never be confused by placing soundings close to them; the symbols, as they represent the greater dangers, are of much more importance than adjacent soundings.

The elevations of islets or rocks bare at high water should be shown *parenthetically* in slanting figures when they appear in water areas in order to distinguish them from nearby soundings.

When of sufficient importance and the information is available, the height of rocks which are bare at low water and covered at high water should be indicated as follows: *bare 7 ft LW* or *bare 7 ft LLW*. As indicated in these legends, the use of periods after abbreviations within water areas, is not permitted on nautical charts.
