In the example shown, *AG* is a line of the main scheme of the triangulation. The lines *AB*, *BC*, *DE* and *FG* were readily measurable but the topography prevented the measurement of the lines *CD* and *EF*. However, the base was measured and the different points connected by triangulation as shown. The least square adjustment of the base net insured the closing of the triangles and the accord of lengths when computed from the various measured sections. The line *AG* was then held as a base in the adjustment of the main scheme.

Such a type of base may well be used in several cases. Two such cases become at once apparent. First, where the triangulation is being extended up a river and has reached a point where the river is narrow and winding and figures necessarily have become weak. The chief of party feels the need of an adequate check on his length but finds no site where he can measure a full size continuous base. However, there may be numerous possibilities if he resorts to the method outlined above. He may find it possible to measure part on one side of the stream and part on the other. The second case is where the triangulation is advancing from island to island, as for example in some parts of Alaska. It may be possible to measure part of the base on one island and part on another.

In making use of this type of base the following precautions should be observed:

1. It should be used only as a last resort. If it is at all possible to measure the base in the orthodox manner, that should be done unless the time and expense factors render it prohibitive.

2. Care should be taken to secure expansion through good figures. Angles should be measured with extreme accuracy. The value of the measured base may be lost through weak expansion or poor observing.

3. The total length measured should at least be equal to the length of the expanded base. For example, in the figure, $AB + BC + DE + FG$ should exceed AG in length.

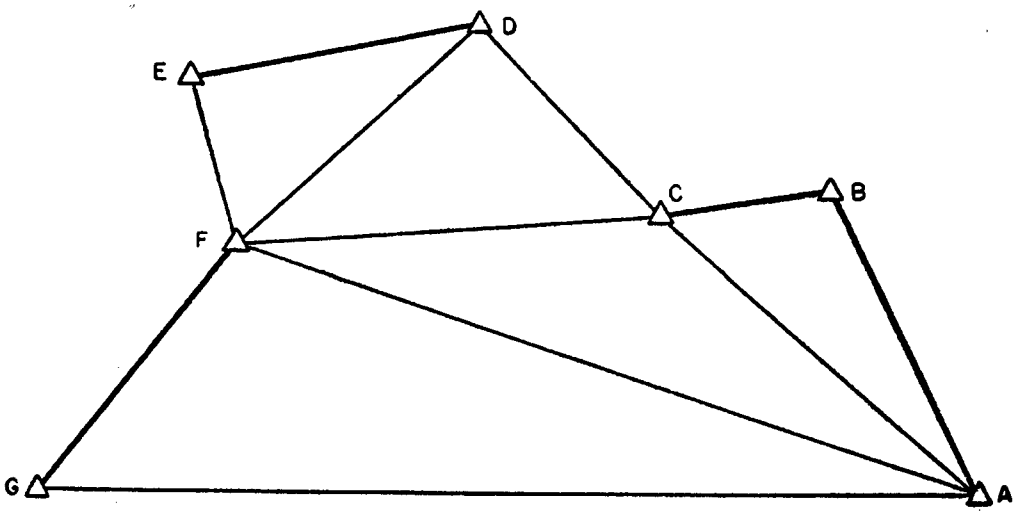

Figure.

FIELD METHOD OF CHANGING SCALE OF TOPOGRAPHIC FEATURES.

by

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Hydrographic field parties often find it necessary to change the scale of the shore line, etc. of a plane-table or aerial photo topographic sheet before using it for boat or smooth sheets. The process described here has several advantages over the method of

subdividing into small rectangles in that it is much faster, probably more accurate and eliminates the necessity of having construction lines on the topo sheet.

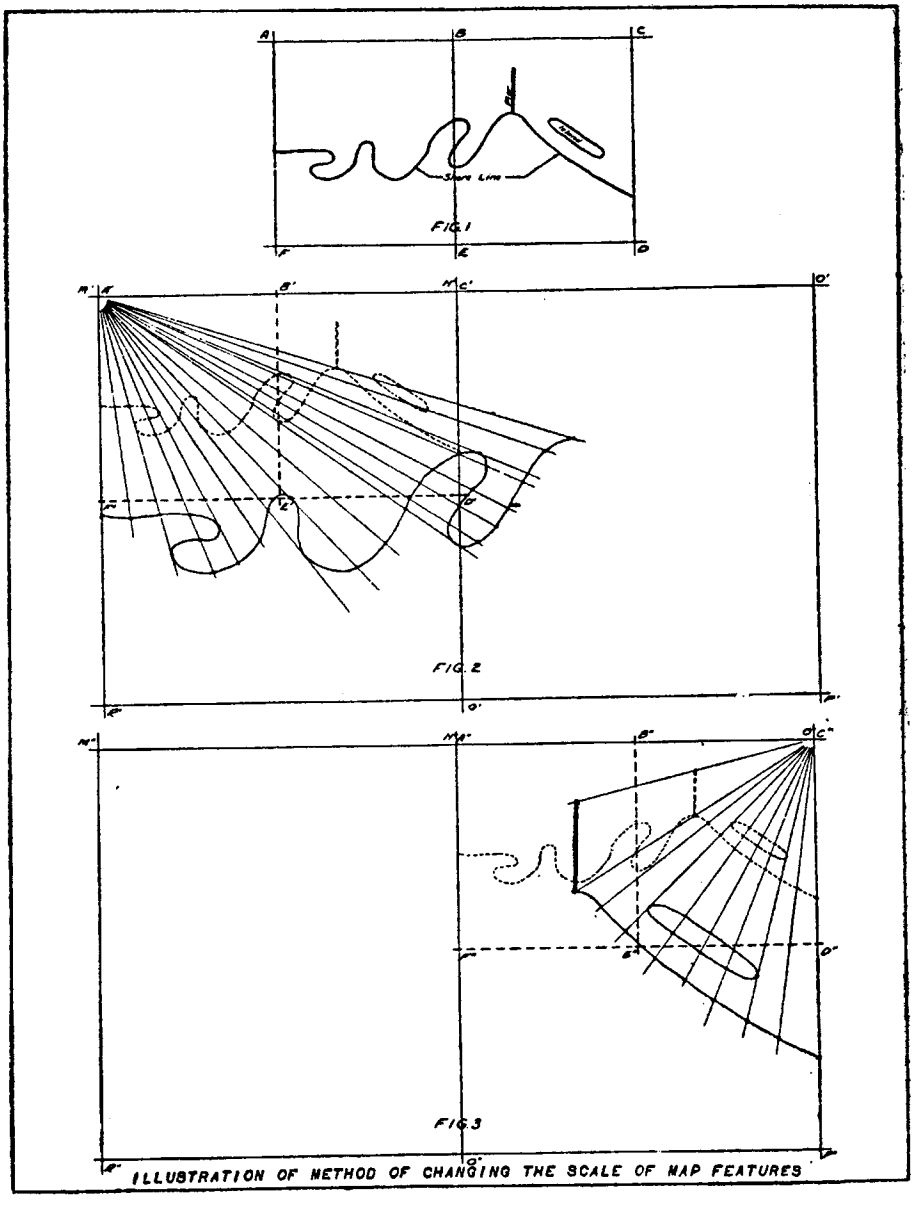

ILLUSTRATION OF METHOD OF CHANGING THE SCALE OF MAP FEATURES

This method will be readily understood from an examination of the accompanying sketch. Assume that Fig. 1 is a section of shore line occupying one minute of latitude and two minutes of longitude at a scale of 1:20,000 and it is desired to reproduce it at a scale of 1:10,000. First draw (or trace) the necessary parallels and meridians at a scale of 1:10,000 on a piece of tracing paper, represented in Fig. 2 by $M'N'O'P'Q'R'$. Place the tracing paper on the original sheet so that $M'N'$ coincides with AB and $M'R'$ with AF. Then draw rays (or construction lines) from the common corner M' through all critical points of the original shore line as seen through the paper and as many other rays as are necessary to secure accurate control for sketching. Then use hairspring

dividers to double the distance from the vertex to the original shore line along each ray and sketch in the shore line using these control points. The transfer to the boat or smooth sheet may then be accomplished by the usual methods.

It should be noted that any common corner (intersection of a parallel and meridian) may be used as the vertex for the construction rays. Fig. 3 is intended to show that part of the shore line from Fig. 1 was expanded on the same tracing paper as in Fig. 2 but from a different vertex. Fig. 3 also illustrates the best practice, which is to keep the construction rays as short as possible and their intersections with the shore line as near as possible to a right angle.

This method may be used to increase or decrease the scale in any proportion, but it will be necessary to use proportional dividers as hairspring dividers are best only for exact doubling of the scale. It is especially convenient to use this process in irregular changes of scale, such, for example, as would be encountered in expanding aerial photo topography from a scale of 1:20,000 with a scale factor of .95 to a scale of 1:10,000. To do this, it is necessary to adjust the proportional dividers so that one minute of longitude (or latitude) on the aerial photo projection will fit one side of the divideer while one minute of longitude (or latitude) at a scale of 1:10,000 will fit the other sids of the dividers. The rest of the process will be evident from the foregoing.