

# **THE PLANE-TABLE AND ITS USE IN TOPOGRAPHICAL SURVEYING**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649436491

The Plane-table and Its Use in Topographical Surveying by United States Coast Survey

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**UNITED STATES COAST SURVEY**

**THE PLANE-TABLE AND ITS  
USE IN TOPOGRAPHICAL  
SURVEYING**





THE  
PLANE-TABLE

AND ITS USE IN

TOPOGRAPHICAL SURVEYING.

---

FROM THE PAPERS OF THE  
UNITED STATES-COAST SURVEY.

---

NEW YORK:  
D. VAN NOSTRAND, PUBLISHER,  
23 MURRAY STREET AND 27 WARREN STREET.

1869.

Eng 518, 69, 3  
12.9

JUN 20 1917  
TRANSFERRED TO  
CANTON COLLEGE LIBRARY

Entered according to Act of Congress, in the year 1880, by

D. VAN NOSTRAND,

in the Clerk's Office of the District Court of the United States for the Southern District  
of New York.

# THE PLANE-TABLE

AND ITS USE IN

## TOPOGRAPHICAL SURVEYING.

---

THE following description of the plane-table, and notes upon its use, in the shape in which it is at present employed upon the Coast Survey, are given as the results of a long experience of its good qualities on that work. Being the instrument best adapted to topographical purposes, it is desired to supply information not to be found in the very inadequate notices given of it in most American and English works, and to furnish topographical surveyors with a practical manual of its use. This paper may seem, in some cases, somewhat amplified, but those more familiar with the instrument will overlook details intended for the benefit of beginners.

The invention of the plane-table is ascribed to Prætorius in 1537, but the first published description appears to be that of Leonhard Zubler, in 1625, who ascribes the "beginning" of the instrument to one Eberhart, a stonemason. From this time forward it has received successive improvements, chiefly from the Germans and French, until it has reached its present form, which seems to be in keeping with the existing state of science.



**DESCRIPTION.**—Topography is a more or less detailed representation, in the form of a map, of a certain area of ground, on a specified scale or proportion of nature, mechanically constructed by the measurement of angles, direct linear measurement, and tangential lines. In plane-table practice these are drawn in pencil upon the paper, which is spread upon the table, and the details are filled in according to established conventional signs. The work is so conducted that the required figure is obtained in the field at once by the simultaneous measurement and plotting of the angles; and while it is done with as much accuracy as it could be plotted with a protractor, errors of transfer are avoided and much time saved.

The plane-table at present in use by the Coast Survey (see Plate No. 1) is composed of a well-seasoned drawing board, with bevelled or rounded edges about thirty inches in length, twenty-four in width, and three-quarters of an inch thick. It is commonly made of several pieces of white pine, tongued and grooved together, with the grain running in different directions to prevent warping. It is supported upon three strong brass arms, to which it is fastened by screws passing through them and entering the under side of the board, the three holes for the reception of the screws being guarded by brass bushings let into the wood, and situated equidistant from each other and from the centre of the table. By means of these screws the board can be removed at will. The arms rest upon the sloping upper face of a conical plate of brass, to which they are permanently fixed. Upon its lower edge or periphery this cone is fashioned into a horizontally projecting rim, the inferior face of which is as nearly as possible a perfect plane, and this in its turn rests upon a corresponding rim of a somewhat greater diameter, projecting slightly

beyond it. This second rim forms the upper and outer flange of a circular metal disk in the form of a very shallow cylinder. The inferior face or plane of the upper flange or rim has, at its contact with the superior face of the lower, a horizontal rotatory movement about a common centre, which is the centre also of the instrument, and the two are held together by means of a solid conical axis of brass extending upwards from the centre of the inner face of the lower disk. A socket of similar shape fits exactly over this axis, projecting downward from the inner side of the apex of the conical or upper disk. The two plates are held together by means of a mill-headed screw capping the cone from the outside, and which can be loosened or removed at pleasure.

A clamp fastened to the edge of the upper rim permits, when loose, the revolution of the table about its centre, and, when clamped to the lower limb, holds the table firm, while a tangent screw gives a more delicate movement.

Three equidistant vertical projections of brass grooved on the under side, and cast in one piece with the under face of the lower disk, extending from the periphery towards the centre, rest upon the points of three large screws which come through a heavy wooden block below. This block, which is the top of the stand and is approximate in form to an equilateral triangle, is made of three pieces or horizontal layers, and is two and-a-quarter inches thick and very strong.

The three screws last mentioned have large milled heads, are quite stout, and play through the block from below by means of brass female screws let into it. They are the levelling screws of the instrument, and are equidistant from its centre.

Upon the under side and centre of the lower metal disk is a socket containing a ball with a brass arm, which projects through the centre of the block from beneath. The lower end of the arm is threaded, and upon it plays a female screw with a large milled head, which can be relaxed or tightened at pleasure. This screw clamps the whole upper part of the instrument to the stand; it is loosened only before levelling, and kept securely clamped at all other times.

The block is supported upon three legs, and with them forms the tripod or stand of the instrument, the legs being of such a length as to bring the table to a convenient height for working, and so arranged as to be taken off at will, or closed so that their iron-shod and pointed ends can be brought together or moved outward, as may be required. For lightness the legs are generally made open through the middle of their length, though sometimes they are solid, and each one is fashioned at the top into a cylindrical form with an outer flange, the cylinder fitting into a groove on the under side and near the edge of a truncated vertex of the block. The flange, by coming in contact with the lower edge of the block, prevents a too great spread of the legs. A brass screw, connected at right angles with the middle of a movable bolt which runs through the axis of the cylindrical head of the leg, and projecting through a hole in the block, is fastened above by a female screw with a large milled head.

A pair of compass sights or a watch telescope has sometimes been attached to the under side of the board of the plane-table. When the table has been put "in position," the watch telescope is directed to some well-defined object, and by after reference to it any movement which may have taken place, out of position, in the table during its use, can