

**ADJUSTMENTS OF  
THE COMPASS,  
TRANSIT, AND LEVEL**

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Adjustments of the Compass, Transit, and Level by A. V. Lane

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**A. V. LANE**

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OF THE  
COMPASS, TRANSIT, AND LEVEL.

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## PREFACE.

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**A**N examination of those text-books in which this subject is or should be treated, reveals the fact that it is for the most part very meagrely and arbitrarily presented, sometimes dismissed with the statement that the adjustments should be made by the maker of the instrument. The method, when given, is generally without explanation or proof that it will accomplish the desired object, so that the student must either take the author's word for it, get some one to explain it to him, or work it out for himself; and being usually unprepared for such original work, he is in danger of adopting the first course mentioned, or of leaving the matter in doubt and mystery.

A great source of trouble lies in the fact that such authors are expected to express themselves in accurate terms and do not; the word "half," for example, being so often used for that which is at best but approximately so, that the student marvels at the talisman for such diverse operations being so uniformly that particular fraction.

Perhaps the absence of explanation and proofs of the

correctness of some of the methods is largely due to the difficulty of making the subject clear to those who have not studied Descriptive Geometry. It is believed, however, that one whose attainments in the line of mathematics go no further than through Elementary Trigonometry will experience no difficulty with the following discussion of the adjustments of the three principal instruments used by surveyors and engineers.

This little volume has been called forth by the need of such an exposition of the subject, felt by the author for some time past in presenting the matter to his classes in Engineering, and any suggestions in the line of improvement will be acceptable.

A. V. LANE.

UNIVERSITY OF TEXAS,  
AUSTIN, May, 1886.



## ABBREVIATIONS.



- A*, horizontal axis of telescope (Transit).
- B*, axis of the level bar (Level).
- C*, line of collimation (Transit, Level).
- H* and *V*, horizontal and vertical plane of reference.
- I*, intersection of *A* and *C* (Transit).
- R*, plane of revolution of adjusted *C* (Transit).
- S*, axis of spindle (Compass, Transit, Level).
- W*, intersection of cross-wires (Transit, Level).
- Y* and *y*, longer and shorter distances from *B* to the centers  
of the telescope's wye bearings (Level).
- lt.*, level tube (Compass, Transit, Level).
- l.t.c.*, level tube-case (Compass, Transit, Level).
- l.t.c.a.*, level tube-case axis (Compass, Transit, Level).

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud.

2. The second part of the document outlines the various methods used to collect and analyze data. It describes the use of statistical techniques to identify trends and anomalies in the data, and the importance of using reliable sources of information.

3. The third part of the document discusses the role of the auditor in the process. It explains that the auditor's primary responsibility is to provide an independent and objective assessment of the financial statements. This involves a thorough review of the records and the application of professional judgment.

4. The fourth part of the document discusses the importance of communication in the auditing process. It emphasizes that the auditor must maintain open and honest communication with the client and with the relevant regulatory authorities. This helps to ensure that any issues are identified and resolved in a timely and effective manner.

5. The fifth part of the document discusses the importance of ethics in the auditing profession. It explains that auditors must adhere to a strict code of ethics and must be free from any conflicts of interest. This helps to ensure that the auditor's work is unbiased and that the public interest is always protected.

6. The sixth part of the document discusses the importance of continuous learning and professional development. It explains that the auditing profession is constantly evolving, and auditors must stay up-to-date on the latest developments in the field. This can be achieved through ongoing education and training.

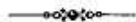
7. The seventh part of the document discusses the importance of transparency in the auditing process. It explains that the public has a right to know how the financial system is being monitored and regulated. This helps to build trust in the system and to ensure that it is operating in a fair and equitable manner.

8. The eighth part of the document discusses the importance of collaboration between different stakeholders in the auditing process. It explains that auditors, clients, and regulatory authorities all have a role to play in ensuring the integrity of the financial system. Working together, they can identify and address any issues that may arise.

9. The ninth part of the document discusses the importance of accountability in the auditing process. It explains that auditors must be held accountable for their actions and must be able to justify their findings. This helps to ensure that the auditing process is transparent and that the public interest is always protected.

10. The tenth part of the document discusses the importance of innovation in the auditing profession. It explains that the auditing profession must embrace new technologies and methods to stay relevant and effective in the 21st century. This can help to improve the efficiency and accuracy of the auditing process.

## I. THE COMPASS.



1. **The Plate-Levels,** — to so adjust them that when their bubbles are centered, the plate shall be horizontal.

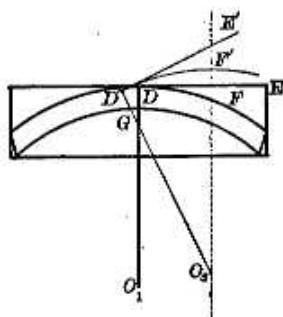


FIG. 1.

Let the *l.t.c.*  $GE$  be turned in a vertical plane and about its center  $G$  through an angle. The bubble, which was at  $D$ , the center of the *l.t.*, will move to a point  $F'$  found by raising a vertical through the new position of the center of curvature of the *l.t.* The arc  $D'F'$  through which the bubble has moved subtends the angle

$$O_2 = DGD' = \text{the angle between } DE \text{ and } D'E';$$