

the case heretofore. The progress of coastal surveys permits one to envisage representations of the ocean floor by means of depth contours which depict the deepest feature of the abysmal depths. Deep-seated valleys, which cut out large indentations on the edges of the continental shelf, give the coastal configuration a particularly characteristic appearance, impossible to represent by means of mere depth-figures. The necessity of gigantic enterprises, the elaboration of which has become possible thanks to modern methods, is recognised; the examination of ancient charts alone was unable to show this necessity.

---

## ON THE GRADUATION ERRORS OF CIRCLES USED IN GEODETIC OPERATIONS

and on Methods which make it possible to reduce their influence.

by

J. BAILLAUD.

*Bulletin Géodésique* No. 42, Apr.-May-June 1934, pages 37 to 68.

---

The Author, who is an Astronomer of the Paris Observatory, shows that the errors of graduation in azimuth circles are of great importance and are the cause of imperfections which are much less negligible than are other errors which geodesists take the greatest care to avoid. Astronomers study the divisions of their circles very closely and geodesists should do so also; however they do not require the same extreme accuracy. For this purpose the errors of some of the fundamental divisions (every 10th degree for example) should be determined by the MARTH method; this method has the advantage of avoiding the accumulation of errors but requires somewhat lengthy calculations. The intermediate divisions may be merely compared to a standard distance.

Provided that these errors of graduation be taken into account, the Author advocates, for observing angles, a return to the *repetition* method using two opposed microscopes only. With the present well constructed instruments this method no longer has the defects attributed to it; the principal advantage of the *reiteration* method was that by using a larger number of graduations it compensated the graduation errors to a certain extent.

After giving a diagram of a *repeating* azimuth circle based on the above principles, the author expresses the hope that geodesists will re-examine the question of using the repetition method.

P. V.

---

## J. F. CAMPBELL, 1822-85, AND HIS REFRACTING QUADRANT.

(Extract from an article by R. T. GUNTHER published in *Nature* - London,

18th August, 1934, p. 251).

---

Last year I purchased at auction a well-made piece of optical apparatus which intrigued me because I could not divine its purpose. It looked like a sphere of glass with circles etched upon it, set in a block of wood. After cleaning, some writing and the initials J. F. C. appeared on the box which I finally recognised as those of J. F. CAMPBELL. But although his name as applied to the CAMPBELL-STOKES Sunshine Recorder is a household word, none of the physicists or meteorologists to whom I applied for information knew anything about the man. Nor have I been able to find that any obituary notice of him appeared in *Nature* or in the usual journals.