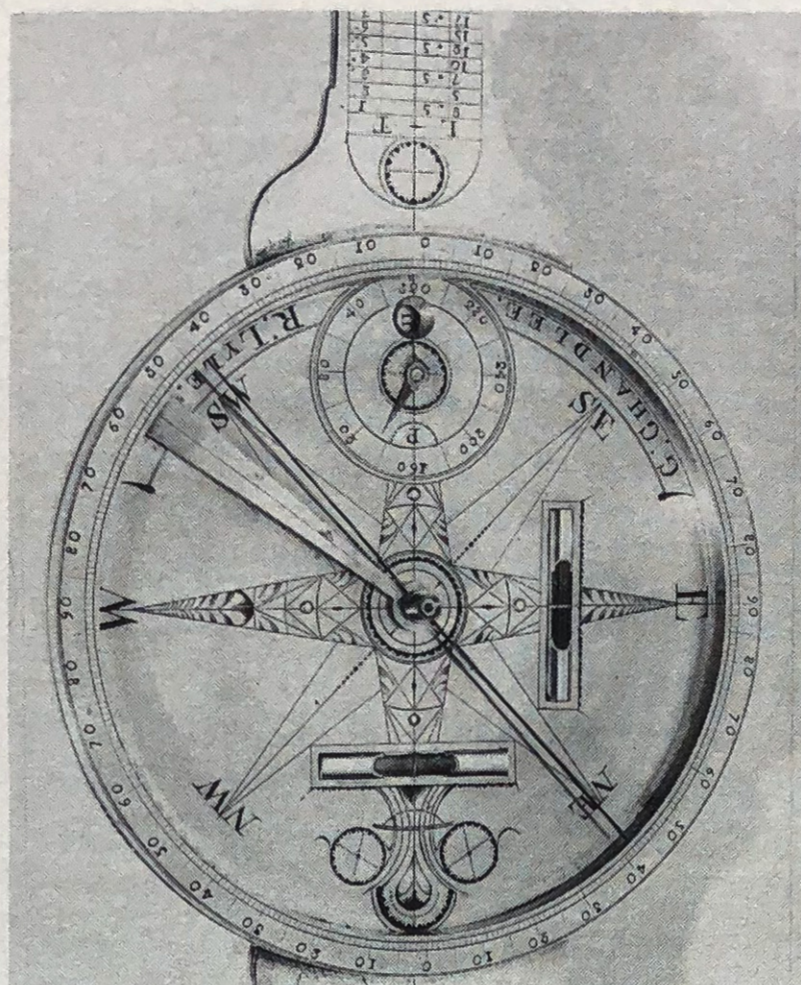




Mr. Frank Mason, Sales Manager of Teledyne Gurley (formerly W. & L.E. Gurley Company) of Troy, New York has graciously asked us to inform the readers of the *Collectors' Corner* that if they wish information about Gurley instruments having serial numbers, they may write to the company and a prompt reply will be forthcoming. Inquiries should be addressed to Frank Mason, Sales Manager, Teledyne Gurley, 514 Fulton Street, P.O. Box 88, Troy, NY 12181. However, inquiries concerning instruments lacking serial numbers are more appropriately addressed to the Surveyors' Historical Society, PO Box 160502, Fort Sutter Station, Sacramento, CA 95814.

In a description of surveying compasses made by Goldsmith Chandlee and George B. Graves in the November 1984 issue, we attempted to explain the "L. & T. Table" and the "outkeeper" featured on many of the compasses made by Goldsmith Chandlee. There has been much uncertainty and speculation about the function of this table and the "outkeeper." Over the years I have discussed these features with the late Charles E. Smart and others, without reaching a satisfactory solution. My inadequate explanation brought responses from two readers, which provide further enlightenment, and appear to resolve the question. The advantage of a *Collectors' Corner* is that it not only informs collectors among our readers, but occasionally the informer as well!

Mr. J.L. "Larry" Young of Hot Springs, Arkansas provided a fascinating account too long to reproduce in full but from which the following is extracted. In explanation of the circular dial he writes "Beginning with Tiffen's instructions of 1815, the contractor was directed to use a 2-pole chain of 50 links (33 feet). This was in effect until late in the century when the 4-pole [chain] was permitted in level terrain. He was also to use 'tally rods' (chaining pins) and, although the number was not at first specified, it is believed that 11 was universal. The rear chainman was to be left one and the forward chainman was to leave one at each pull of the chain. As today he was to place the last one at the end of ten pulls and to yell 'Out.' At that point the compassman would advance the Outkeeper to 1 in the opening and the pointer would indicate 20. Ten pulls of a 2-pole chain is 1.5 chains, 2 20 poles. It is also 330 feet, 20 rods, perches, 1/2 furlong (for racing fans) 16 'Outs' and 320 poles is 80 chains



or a mile, and the unit of the rectangular system of surveying."

With reference to the "Linear Table," Mr. Young states "the table begins not with 1 1/2 but with 2 1/2 with the ensuing figures 5, 7.5, 10, 12 1/2, 15, 17 1/2, etc. 'L' does not refer to paces nor does 'T' to the number of paces, for such interpretation would not have any meaning or use for the surveyor. 'L' stands for 'Links/Mile' and the 'T' for 'Traverse.' The accepted or commonly used for 1 Minute at 80 chains was 2.5 links. This was soon refined to 2.3 links. However, neither value has any real meaning when one considers that a compass can only be esti-

mated to 1/4 degree, and no standard of accuracy has been specified by the government prior to the letter of instructions sent by the Surveyor General at Little Rock. This linear chart is the forerunner to the *Standard Field Tables* published by the Government Land Office in about 1910. In a second edition of 1913 and in the 8th edition of 1956, 'Table 3—Traverse Table for the Correction of Random Lines' is used for the same purpose. All of the above was peculiar to the survey of the public lands in the early years and was probably passed on from one deputy surveyor to another, and in all probability had never been included in the training of most surveyors and engineers within the past century."

David Krehbiel, professional engineer of Camdentown, Missouri, also pointed out that the L/T Table should be corrected to read 2.5 rather than 1 1/2. In his opinion the "L" represents "links" of deflection in one mile, and the "T" the "tangent" angle in minutes corresponding to that deflection. He believes that the practice at that time supported the use of such a table. Although it was generally believed that these features appeared only on instruments made by Goldsmith Chandlee, he notes further that he owns a surveying compass with the name of Jonathan Simpson that has a similar dial, and another circular dial marked 10 through 90 with singular marks between the increments of 10. Mr. Krehbiel's "Justification of the L/T Table" is herewith illustrated, as well as a detailed view of the dial

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LINKS (L)	CONVERSION TO FEET	DEFLECTION PER MILE	COMPUTED TANGENT	TANGENT ANGLE (T)	ACTUAL TANGENT
2.5	× 0.66	1.65/5280	.00031	1 ¹	.00029
5.0	× 0.66	3.3/5280	.00062	2 ¹	.00058
7.5	× 0.66	4.95/5280	.00094	3 ¹	.00087
10.0	× 0.66	6.6/5280	.00125	4 ¹	.00116
12.5	× 0.66	8.25/5280	.00156	5 ¹	.00145
15.0	× 0.66	9.9/5280	.00187	6 ¹	.00175
17.5	× 0.66	11.55/5280	.00219	7 ¹	.00204
20.0	× 0.66	13.2/5280	.00250	8 ¹	.00233
22.5	× 0.66	14.85/5280	.00281	9 ¹	.00262

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plate of a Goldsmith Chandlee compass in the writer's collection in which the outkeeper and L/T table are more clearly visible.

Jonathan Simpson (1787-1863) was a native of Virginia who established himself as a silversmith and clockmaker in Bardstown, Kentucky, and later moved to Madison, Indiana. In addition to works in silver and clocks, he also produced surveying instruments, examples of which are owned in the Kentucky Historical Society and the Missouri Historical Society.

Davis Shupe of Loveland, Colorado, a professional engineer and surveyor, has among his old surveying instruments "a solid brass transit of the Jacob's staff vintage. It is inscribed . . . James Foster, Jr. Cincinnati, O."

The maker of the instrument, James Foster, Jr., was born in Baltimore, Maryland in 1814 and at an early age moved to Cincinnati. He served an apprenticeship at the Cincinnati Type Foundry and remained with the foundry until it closed as a consequence of the financial depression of 1837. In 1838 he formed a partnership with William Wells, named Wells & Foster, and began manufacturing optical and philosophical instruments in a single room on Third Street. The firm subsequently moved to a storeroom in the old Universalist Church on Walnut Street where it remained until about 1852. The partnership was dissolved at that time and Foster thereafter worked alone at Fifth and Race Streets. He died on May 13, 1873 at his residence in Linwood, Spencer Township, Hamilton County, Ohio. Foster was known as a hard worker and the obituary notice in the *Cincinnati Inquirer* implied that he died from overwork. Among his known surviving instruments is a solar compass in the collection of the Oregon State Logging Museum at Klamath Falls, Oregon and a transit in the Ohio State Museum at Columbus, Ohio.

William W. Primm of Jackson, Michigan, owner of a surveying compass made by Andrew Meneely of West Troy, New York, in what appears to be its original case, requests information about the maker.

Andrew Meneely (1802-1851) was a native of West Troy (now Gibbonsville), New York, and at an early age served an apprenticeship with a local bell founder and maker of mathematical instruments named Julius Hanks. Remaining with his master until the age of 21, Meneely then went to Auburn, New York to work for Horatio Hanks, brother of Julius, who was engaged in the same business. There Meneely worked particularly on the production of surveying instruments. In 1826 he married a cousin of his master. In the same

year Horatio Hanks moved to Troy, and Meneely returned to West Troy where he established his own shop for bell founding and making mathematical instruments. During the next ten years his bell foundry became one of the foremost in the country. In 1836 he took Jonas V. Oothout at a partner, changing the firm name to Meneely and Oothout. Upon Oothout's retirement two years later the firm returned to its original name. In 1849 Meneely admitted his son Edwin as a partner and once more changed the firm's name, to Andrew Meneely and Son, under which it continued until the founder's death in 1851. Meanwhile, despite the popularity of Meneely's surveying instruments, the firm's major output was in bell founding, and in 1852 the making of mathematical instruments was discontinued. The Meneely line of surveying instruments may then have been taken over by the brothers W. & L.E. Gurley, who had just established their own firm in Troy. Edwin Meneely continued in business until his own death early in 1887.

Zea Z. Dolgin of Milwaukee, Wisconsin inquires about a transit made by Leupold and Volpel of Portland, Oregon, having the serial number 76. The instrument was purchased from the David White company in Milwaukee in about 1956.

The firm of Leupold & Volpel was founded in 1907 by Frederick Leupold (1875-1944) and Adam Volpel (1875-1940).

Leupold was born in Ravensburg, Wurttemberg, Germany, and after serving an apprenticeship in a large industrial plant in Augsburg, he emigrated to the United States at the age of 16. He worked for various firms in the eastern United States, including Holzer-Cabot Electric Company, Kidder Press Company, and C.L. Berger & Sons. Adam Volpel was a native of Austrian Poland. In 1911 J.C. Stevens became associated with the firm and, following the death of Volpel in 1940, Stevens bought out his interest. The firm continues in business in Portland, Oregon as Leupold & Stevens Instruments, Inc. The instrument owned by Mr. Dolgin presumably was made within the first several years of the partnership.

Farris W. Cadle of Swainsboro, Georgia enclosed photographs of two surveying compasses in the collection of the Georgia Historical Society in Savannah. "Both are made of brass, have 'screw-on' sights, and are graduated to the nearest degree. One has no bubble level and is engraved 'Walker*Dublin.' The other has two bubble levels, is engraved 'L. Colton, New York,' and has a wooden case that appears to be made of mahogany." According to an article provided by Mr. Cadle from the *Savannah Daily Journal and Courier* of April 10, 1855,

representatives of the late Alexander Gray Raiford presented the Georgia Historical Society with the Walker compass "believed by Mr. Raiford, on what he deemed sufficient evidence, to be the identical compass brought over to Savannah by Gen. Oglethorpe, and the first ever used in running a line in Georgia. It had been in the possession of Mr. Raiford, its late owner, for forty years anterior to his decease. . . . While owned by him it had been used in surveying several districts of Georgia, and was regarded as a very correct and reliable instrument."

The Walker instrument is well known to this writer, who attempted to research its provenance some years ago without success. The name of a maker of mathematical instruments named "Walker" working in Dublin does not appear on lists of instrument makers. However, it is believed that he worked in Dublin, Ireland. A similar surveying compass also marked "Walker, Dublin" is in the collection of the Museum of the History of Science at Oxford University.

Levi Colton (1803-1885) was a native of Longmeadow, Massachusetts and learned the trade of jeweler and silversmith. He pursued this career in New York, Boston, Utica and other cities. He then worked in a life insurance agency. In 1854 he was listed as a maker of mathematical instruments in Hartford, Connecticut with a shop on Russell Street. A vernier surveying compass inscribed "L. Colton & Co., Hartford, Ct." is in the collection of the Connecticut Historical Society at Hartford. Several surveying compasses inscribed "L. Colton, New York" are in private collections. PS

The description and identification of surveying instruments would be made much more effective for our readers when illustrated. Although photographs hitherto submitted to the Collectors' Corner are usually adequate for identifying the maker and special features, they have not been suitable for reproduction. Clear and sharp black-and-white photographs suitable for reproduction in these pages would be greatly appreciated. If desired, they can be returned to the owner after use by the printer.

BOSTROM-BRADY MANUFACTURING COMPANY

Decatur, Georgia

founded in 1905, is still in business. According to Ralph Blanchard, the firm maintains parts from the period of its establishment and can examine and repair early instruments it produced. Numbers that appear on Bostrom-Brady instruments, such as "55," may not be serial numbers but an indication of the year in which they were made, i.e. 1955. Contact the firm at 114 New Street, Decatur GA 30030.