AN IMPROVED HIGH-PRECISION JACOB'S STAFF DESIGN

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INTRODUCTION

High-resolution stratigraphic research is greatly facilitated by a Jacob's staff design that allows an Abney hand level or a Brunton compass to be moved up or down the staff quickly and precisely for measuring thin lithologic units. Elder (1989) described a design that works well for this purpose, with a bracket clamped to the staff with a thumb screw. After using a similar design, I modified it by replacing the thumb-screw arrangement with a spring-loaded clamp, which makes it much easier to use.

DESIGN OF BRACKET

The bracket (Figs. 1, 2) is made of aluminum and consists of a tube that slides over the staff with a flat bar welded on one side for mounting an Abney hand level at right angles to the staff. Below that is a spring-loaded clamp that holds the bracket in position until it is released. The clamp consists of a lever whose upper end is held against the staff by a strong spring (valve spring from a Volkswagen air-cooled engine) at the lower end of the lever. A short round-headed bolt screwed into a hole in the upper end of the lever pushes against the staff, through a hole in the bracket tube. When the lower part of the lever is squeezed, the upper end of the lever moves away from the staff so that the bracket can be moved to another position on the Jacob's staff. This eliminates the necessity to turn a thumb screw to clamp or release the bracket. The lever pivots on a pin that passes through holes drilled through the 1/4″ (0.6 mm) thick aluminum lever and through the two fulcrum pieces welded to the tube. The spring fits into a hole drilled part way through the lever, and the other end fits over a small piece of aluminum welded onto the tube. The diameter of the tube is determined by the size of the staff. My staff is a 22.5 mm (7/8″) diameter by 1.83 m hardwood curtain rod purchased at a building supply store, and the aluminum tube has an inside diameter of 24 mm (15/16″).

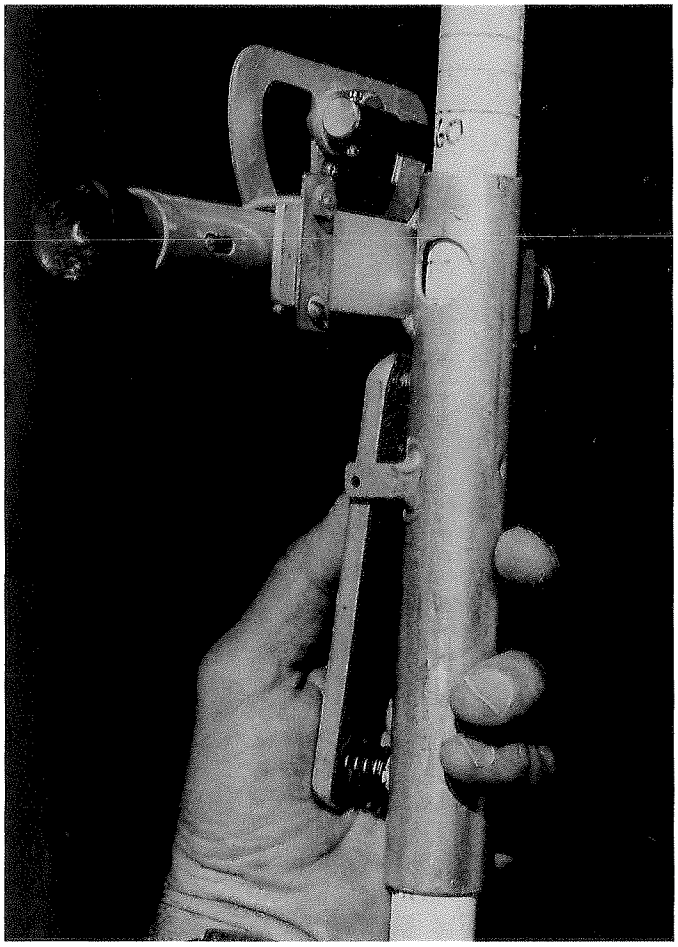

FIG. 1.—Photograph of the aluminum bracket with an Abney hand-level attached, on a hardwood staff with markings at 1 cm intervals.

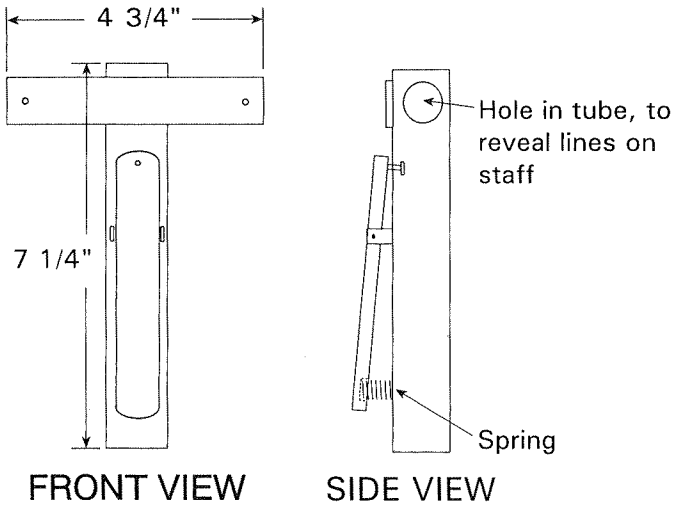

FIG. 2.—Drawings showing the design and dimensions of the bracket.

The Abney level shown in Figure 1 is fastened to the bracket with U bolts. Some Abney levels have threaded mounting holes in the side of the body of the level, and can be fastened with screws that pass through two corresponding holes (as in Figure 2, front view) drilled in the bracket. The bracket can be used with a Brunton compass in place of the Abney level by modifying the top of the bracket so that the Brunton compass can be clamped in place, as in Elder's (1989) design.

This design costs more to build that a simple bracket with a thumb screw, but after using both types extensively in the field I find the efficiency of the spring-loaded bracket to be well worth the extra cost. It eliminates the time spent loosening and tightening the thumb screw, and the bracket can be easily and quickly repositioned when necessary.

One staff that I use has a 5× magnifying Abney level, which works well for measuring over long distances. A nonmagnifying Abney level is preferable for a project involving work at close quarters on a steep outcrop, and is a better choice for all-around use.

ACKNOWLEDGMENTS

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REFERENCE

ELDER, W.P., 1989, A simple high-precision Jacob's staff design for the high-resolution stratigrapher: PALAIOS, v. 4, p. 196–197.

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