# A NEW LIGHT-WEIGHT SHAFT FOR PEAT SAMPLERS

ROBERT W. LICHTWARDT
Botany Department, Oberlin College, Oberlin, Ohio

A NEW light-weight peat sampler shaft has been devised, with an improved device for coupling and uncoupling the segments, that can be adapted for use with both the Hiller (Swedish) and the Davis (American) sampler heads. The advantages of the newly designed segments over the older types are:

1. Great decrease in weight without sacrificing strength requirements.
2. Ease and rapidity in coupling and uncoupling the segments.
3. Interchangeability of the segments.
4. Utility of the shaft to adapt to any type of sampler head.
5. No tool requirement for coupling and uncoupling.

The shaft segments are made of aluminium alloy tubing, and are each one metre long. Each section weighs only 341 g., as against the same length Hiller borer shaft section weighing an average of about 713 g. or the Davis rods weighing about 688 g. per metre. This is a decrease in weight of over 100 per cent, an important consideration for the scientist who must hike with the equipment. The tubing used is an aluminium alloy containing copper, magnesium and manganese, and is sold in the United States under the name Alcoa (24S-T). It has a tensile strength of 68,000 lb./sq. in., and a shearing strength of 41,000 lb./sq. in.

Dr. Paul B. Sears, who first suggested the use of an aluminium alloy to decrease the weight of peat sampling equipment, has used this new equipment in recent work in Mexico, and finds that not only is the strength of the shaft satisfactory, but that the mechanism for joining the segments makes work considerably faster and easier. Other investigators working with the equipment are in agreement.

The new coupling device is shown in section in Text-fig. 1. It consists of an aluminium alloy plug cut from a piece of rod and turned down so as to make a tight press fit in the tubing. The fit is further strengthened by three steel rivets, one of which protrudes to prevent the sleeve from sliding too far. The plug at one end of the segment is drilled and threaded as shown, so that a steel push-pin and coiled steel wire spring are held in place. The spring is packed with waterproof pump grease for protection. The screw opposite the push-pin makes the spring easily accessible for repairs.

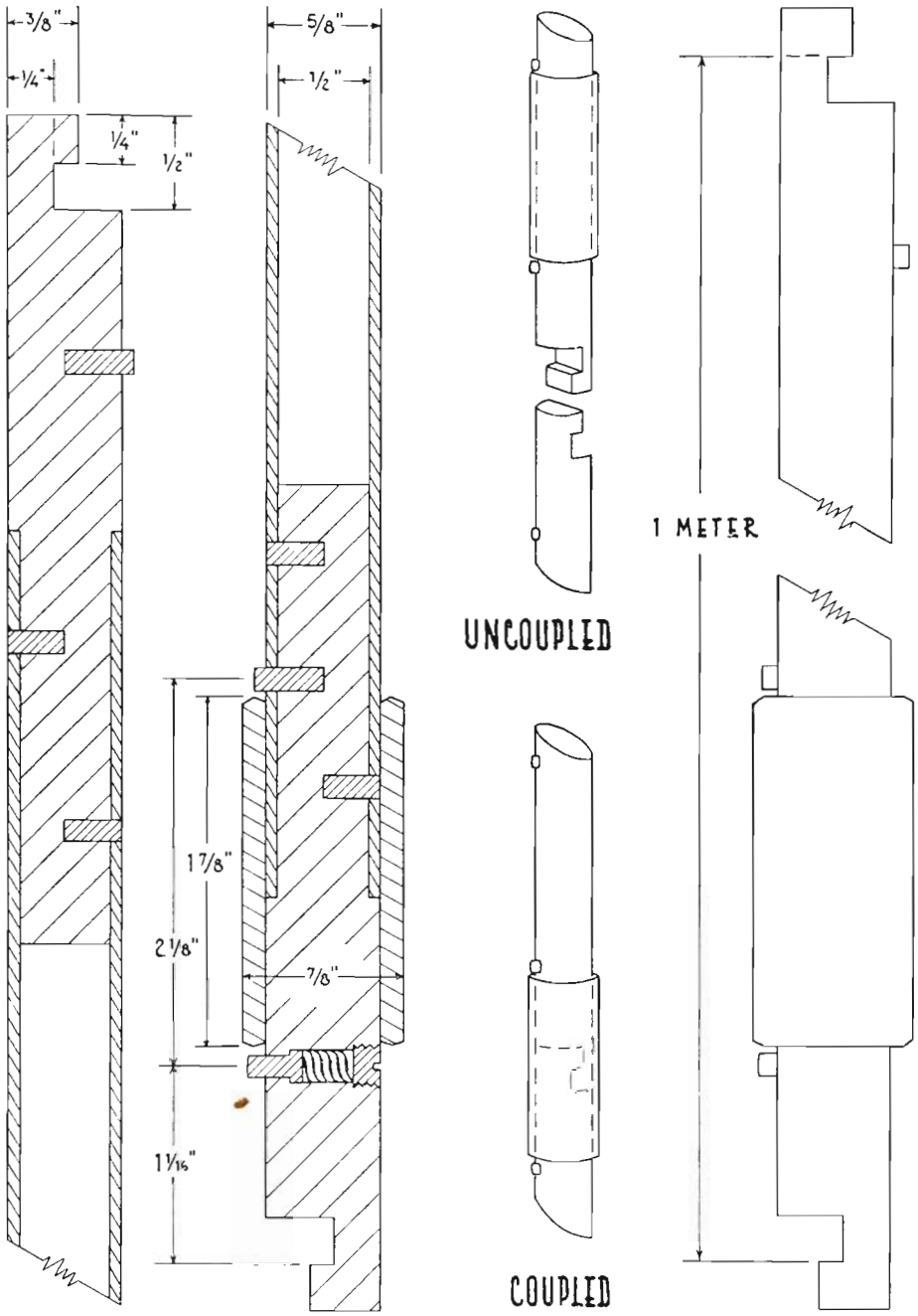
The sleeve is made from ½ in. iron pipe, the inside being reamed out to such a diameter that it will slide easily over the plug, but without play. The sleeve is made of iron, rather than aluminium, because it takes a large share of the strain at the joint.

Since the notches in each plug are identical, the shaft segments may be joined in any order desired. Each segment is marked off by bright enamel at intervals of 25 cm. to indicate the depth of the borings.

The standard Hiller (manufactured by Beus & Mattson Co., Mora, Sweden) and Davis (manufactured by the Eberbach & Son Co., Ann Arbor, Michigan, U.S.A.) sampler heads can be easily adapted to the aluminium segments by riveting on an appropriate length of tubing to which has been fitted one of the plugs. The shaft is well suited for work with either head since the joints will take the longitudinal strains required with the Davis sampler head, or the twist required when using the Hiller borer.

It is recommended that a simple cross-bar handle, like that used with the Hiller borer, be fitted with a coupler so that it can be attached to the last section of the shaft to facilitate the process of boring. An additional convenient attachment is an auger-type drill head which can be used for rapid preliminary investigation of soils and bogs, and for cutting through hard layers of material which one may encounter.

Another advantage of the new joints is that no tools, such as screw drivers and pliers, are needed for coupling or uncoupling the segments, as are necessary with the present Hiller and Davis rods. It is often necessary to hold the lower segments in extracting a peat sample while the upper




TEXT-FIG. 1 — Peat sampler shaft with an improved device for coupling and uncoupling the segments.

segments are being disconnected. It is an easy matter with the new joints for a single operator to couple or uncouple the segments while holding the lower part of the shaft with one hand.

Appreciation is extended to Mr. Harlan A. Hurd, Instrument Maker for the Department of Physics, Oberlin College, for constructing the new sampler shaft, and for his assistance in designing it.