

than the Vi extract. The probable interpretation of these results is that the Vi extract possessed the capacity to produce superior anti-invasive immunity, while the typhoid antigens excelled in producing substances which neutralized the toxicity of large doses of bacterial protein—presumably because these typhoid antigens represented more completely the entire typhoid organism.

Although the Vi extract can be prepared from V-form typhoid organisms, the V-form of *S. coli* 5396/38 offers an appreciably more abundant source of this substance which, despite its extra-generic origin, pos-

sesses exceptional antityphoid immunogenic properties. Practical application of the use of this Vi extract—specifically as a fortifying agent in bacterial vaccines and in combination with conventionally prepared immunogens of the typhoid bacillus—are under consideration. Studies of its toxicity and stability and of its serological characteristics are now in progress and will be made the subjects of later detailed reports.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN APPARATUS FOR MEASURING THE TORSION ANGLE IN LONG BONES

RECENTLY, in a problem involving measurements of the degree of torsion existing in certain long bones of the extremities, it became necessary to construct a device for making such measurements. Although this torsionmeter was devised for use in a particular project, it might also find application in making other anthropometric measurements or in various studies requiring rather exact values for the degree of torsion or twisting of an object. The following is a description of the construction and use of the apparatus.

As shown in Fig. 1, the apparatus consists essen-

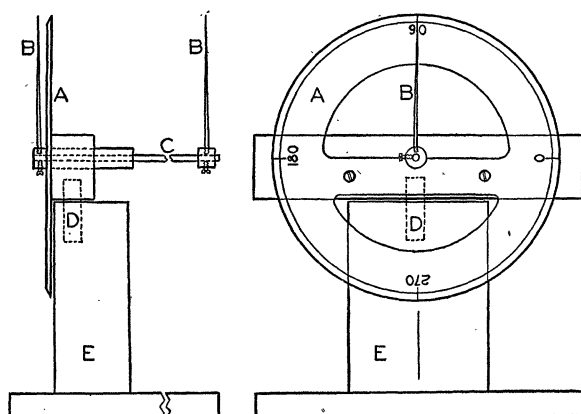


FIG. 1. Diagram of the torsionmeter showing side and front views.

tially of a 360° plastic protractor (A) and a pair of pointers (B), attached to a shaft (C) passing through the protractor's center. The protractor and shaft are mounted on a pivot (D) so that the shaft may be swung from side to side if necessary. To permit this swinging the support (E) must be triangular in cross-section, with the apex directed forward. The whole is mounted on a solid level base.

Shafts of various lengths may be used, depending

upon the length of the object studied, or as in Fig. 1, the indicators may be threaded and screwed into tapped washers; the washers and indicators may then be moved along the shaft and fixed at the desired position with a set screw. The shaft should be perfectly straight and should fit snugly in its bushing.

The size of all parts, of course, will be arbitrarily determined by the size of the object to be studied.

An ordinary ring stand and clamp will usually suffice to hold the object.

Before making a measurement, it is important to have both indicators in exact alignment. The bone (or other object) is clamped rigidly, parallel to the shaft with the long axis of the proximal epiphysis in line with the 90° radius of the protractor. The indicator at the free end of the rod is then turned until it is in line with the long axis of the distal extremity of the bone, and the protractor indicator moves with it. The number of degrees through which the shaft has turned is then read off directly on the protractor.

In cases where the object is not perfectly straight, but is curved to one side or the other, the protractor and shaft may be turned on the pivot until the rear indicator is in alignment with the distal end of the object.

This device has several points to recommend it. The parts are inexpensive and easily obtained. It is easily constructed and readings may be made directly, simply and rapidly.

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