Comments and Communications

Ascorbic Acid in Tea

AN ASSOCIATED PRESS dispatch, dated April 29, 1951, from Moscow, stated that "researches of the Bakh Institute of Biochemistry have conclusively proved that the tannin of tea leaves is equivalent to Vitamin C in citrus fruits."

It may be of interest to scientific readers to recall the fact that in 1935 Henry Tauber and I reported (*J. Biol. Chem.*, **110**, 559) that tea contains 0.22 mg of true ascorbic acid per gram of substance. This is about half to one third as much as is present in citrus fruit juices, and "the amount available from a nutritional standpoint is much less, because of the actual amount used in infusions and hence consumed."

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A Basic Feature of the Chambers' Micromanipulator

AN article by M. J. Kopac (*1*) gave the impression that there is an error in the basic construction of the Chambers' micromanipulator. The modification Kopac introduced is to replace the upright post of the Chambers' instrument with the main body of a standard B & L microscope. This has the excellent feature of introducing a long-range control, both coarse and fine, for the vertical movements. Such a device was indeed tried in one of the earlier Chambers' models, but it was discarded because the stability of the fine horizontal movements would thereupon be dependent on the firmness of the coarse adjustment mechanism of the microscope part. This presented the possibility that wear and tear over a period of time might loosen the adjustment and hence vitiate the efficiency of the fine horizontal adjusting mechanism of the micromanipulator.

The criticism made was that the up-and-down fine movement of the Chambers' instrument, being in an arc, "produces an appreciable lateral displacement of the microtip [of the needle] along with the vertical motion." The possibility of such a displacement was very much on my mind at the time the instrument was first devised and would have condemned using the principle of arc movements unless such a possibility could be circumvented. It was circumvented successfully, so that the principle of arc movements produced by the spreading apart of rigid bars against the springs was finally decided upon as the most practical, efficient, and economical way for securing stable fine movements. Moreover, the construction involves an absolute minimum of frictional surfaces. As a result, instruments constructed by E. Leitz on this arc-movement principle for all three fine movements have been in constant use and are still serviceable after more than 30 years.

The displacement, regarded as a criticism of the construction, is eliminated provided the micromanipulator is properly mounted with reference to the height of the moist chamber on the stage of the microscope. In the field of the microscope the straightness of travel of the microtips, although they move along arcs of circles, is due to the minuteness of the arc (< 2–3 mm) of a 3-in. circle along which the microtip moves. In order to ensure the horizontal movements traveling at right angles to one another, the manipulator has to be put in a proper position with respect to the microscope.

In the present statement, attention is restricted to the mechanism for the up-and-down movement. Fig. 1

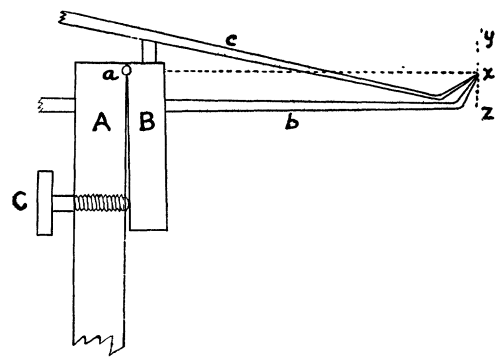

FIG. 1. Diagram of part of Chambers' micromanipulator illustrating the up-and-down moving mechanism. *A* represents the vertical rigid post; *B* is the vertically placed bar, spring-hinged at *a* so that turning the screw *C* will induce an up-and-down movement of the microtip at *x* along the most vertical part of the arc *y–z*. It is immaterial where the shaft of the needle is placed—e.g., either *b* or *c*, provided the shaft is mounted somewhere on *B* and the microtip is at *x*.

is a diagram in which the height of the post *A* is properly adjusted as follows: The pivot, or center of rotation, of the spring bar at *a* must be at a height level with the roof of the moist chamber on the stage of the microscope. This will cause the tip of the microneedle, when touching the undersurface of the cover-slip roofing the operating moist chamber, to be about on the level of a dotted horizontal line, *x*, projected from the pivot and over the microscopic stage. In such a position the microtip will travel along the most vertical part of the arc, *y–z, irrespective of the position of its shaft*—e.g., either *b* or *c*.

The fault of the Chambers' model lies in the lack of adequate control of the coarse adjustments. These adjustments are serviceable chiefly for bringing the tips of the microneedles and pipettes into the field of the microscope. For actual operation only the fine adjustments are to be used. It is to be hoped that Kopac's modification will take care of the coarse vertical adjustment that is sorely needed in the mounting of the microtip in the vertical position. As long as the firmness of the introduced vertical control mechanism is