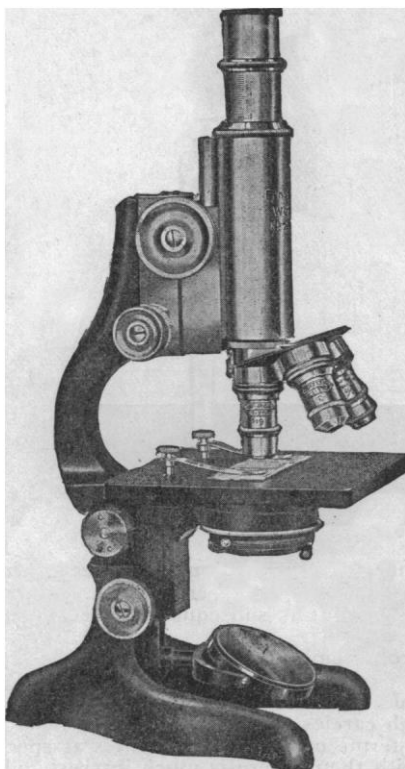


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This instrument measures the speed attained by a cylinder which, by means of a weight acting through a spindle, a gear and a pinion, is caused to rotate in a test cup, while the latter is surrounded by a bath of water or oil to maintain the desired temperature. A revolution counter is connected to the spindle which supports the cylinder, and the number of times required for the latter to make a specified number of revolutions in distilled water and in the liquid under examination forms the basis of comparison.

The test cup is held concentric with the cylinder by three arms projecting inward from the wall of the water bath, while it is prevented from rotating by a stop-plate engaging one of these arms.

The water or oil bath is kept in position by a recess in its support. By loosening the clamping screw in this support it may be raised or lowered, permitting the ready introduction of the cylinder into the liquid in the test cup, the height of the latter being determined by an adjustable collar on the pillar. As generally used, the bottom of the water jacket during the test is placed about $6\frac{1}{4}$ inches above the base to permit heating by a gas burner or alcohol lamp.

This model is an improvement over former models in the following particulars:—

The water bath, test cup, cylinder and spindle have been standardized to permit interchangeability and ready replacement.

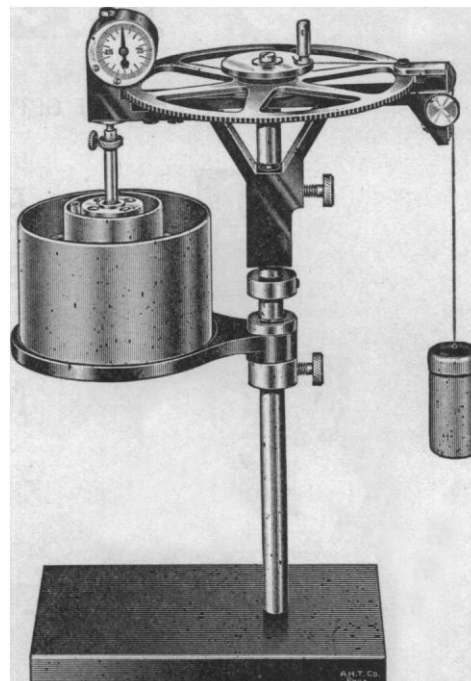
The machine work is more accurate, producing smoother and truer action. The gears, pinions and worm gears are carefully ground in to remove variable friction, thereby insuring uniform motion at slow speeds. The performance of the instrument is subsequently checked by rigid test.

Collar on the pillar is adjustable to prevent the cup from being placed too high.

The cup is held more firmly.

The brake has been re-designed so that it does not make contact with the teeth of the gear. This obviates the possibility of damaging the latter through careless use of the former.

Because of many valuable records now being made in terms of relative viscosities at specified temperatures and the need for making comparisons with them, there is much interest only in such terms. We recommend, however, that wherever circumstances permit, viscosities be determined and recorded in the absolute unit—the centipoise, for which the Stormer Viscosimeter is well adapted as its readings are independent of the specific gravity of the liquid. This is not true of any of the "flow through" types. With the latter the results are kinematic rather than absolute.



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7650.	Stormer Viscosimeter, Improved Model, for general use, as above described. With test cup having two side vanes, central baffle and thermometer holder. Complete in case	\$75.00	Letzo
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7650-B.	Ditto, Special Model for use in determining the consistency of canned corn. Without oil bath or test cup, but with 750 gram weight instead of the regular weight and with an extra plate on the movable shelf for conveniently holding a can of corn. See <i>The Canner</i>, Vol. 64, No. 9 (Feb. 19, 1927), page 23	70.00	Leuci

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SCIENCE

VOL. LXVI

AUGUST 12, 1927

No. 1702

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SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. McKeen Cattell and published every Friday by

THE SCIENCE PRESS

New York City: Grand Central Terminal.

Lancaster, Pa.

Garrison, N. Y.

Annual Subscription, \$6.00. Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

Entered as second-class matter July 18, 1923, at the Post Office at Lancaster, Pa., under the Act of March 8, 1879.

PHYSICAL INDETERMINISM AND VITAL ACTION

SCIENCE and philosophy, but especially science, have found great difficulty in reconciling the apparent indeterminism of many vital manifestations, particularly voluntary action, with the strict determinism of physical science. The traditional problem of freedom, with all its vast implications, is the classical expression of this difficulty. One characteristic aspect of this problem seems peculiarly significant, especially when considered in relation to the present state of discussion on the foundations of physical science. This is the qualified nature of freedom as expressed in external action; there is always a large element of restriction or external determination. No one has claimed that vital indeterminism is complete, although Bergson speaks of the living organism as exhibiting a maximum of indeterminism.¹ To take a simple illustration: the evidence for levitation is doubtful; even its most accomplished exponent would hesitate to launch himself from the edge of a cliff, however firmly he might be convinced of the freedom and efficacy of his own will. And he would continue to rely daily on the mechanical dependability and physically determined regularity of his own bodily organism. I allude to this inconsistency with no merely satirical intention, but simply in order to define as clearly as possible a crucial aspect of the problem. It is undeniable that the organism is subject to rigid physical determination in a large part of its activities; it seems equally undeniable that it is free in others; the difficulty is to decide where determinism ends and indeterminism begins. Intuition gives an overwhelming impression of freedom in voluntary action. Yet analysis, in tracing down the sources of such action, seems always to reinstate determinism; it shows the will to be motivated; motives have their natural origins; actions not consciously motivated either are habitual and referable to past motivation, or are instinctive and determined by heredity. In either case we seem to have a mechanistic determination. Physiology finds in the organism a nexus of physico-chemical determination differing from that in non-living nature only in its complexity; in fact the organism can be shown to depend for its survival on the constancy and stability of its proc-

¹ "Creative Evolution," English translation, Chapter 2; cf. e.g., p. 126.

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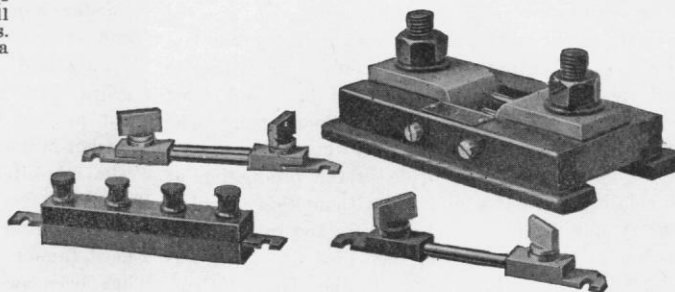
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