SPECIAL CORRESPONDENCE

BRITISH COMMITTEE ON PETROGRAPHIC CLASSIFICATION

AT the Centenary Meeting of the British Association for the Advancement of Science a committee was appointed to examine and report upon petrographic classification and nomenclature. Many outside the few appointed are interested in the problems that will be discussed, and the committee therefore invites readers of SCIENCE to forward their views to the secretary.

In the first place the committee is attempting to evaluate the data available for establishing a sound classification of igneous rocks, and invites replies to the following questionnaire:

(1) Do you agree that classification should be based upon ascertainable facts (*i.e.*, composition, both mineral and chemical, texture and geological occurrence, as distinct from hypotheses—of origin, etc.)?

(2) To what extent should the classification be based upon chemical composition as expressed in percentages of specific oxides?

(3) How far should the classification be based upon facts of geographical distribution, *i.e.*, upon the recognition of petrographical provinces?

(4) Are you in favor of the separation of igneous rocks into *three* divisions: plutonic, hypabyssal (dyke rocks) and extrusive (lavas), following Rosenbusch and others; or into two divisions only, following Zirkel, Iddings and others?

(5) If in favor of three divisions, would you base the separation of the second from the third upon (a) texture or (b) actual geological occurrence?

(6) Should the naming of a rock be determined by the nature of the eruptive rocks with which it is associated? For example, trachybasalts (trachydolerites, Rosenbusch) are only distinguished from normal basalts by their occurrence with other alkali-rocks.

(7) In aiming at a complete classification for general acceptance by petrographers, are you in favor of retaining time-honored rock names, with meanings differing in many cases from those originally given to the names, or of introducing a new nomenclature?

(8) Do you think that the requirements of field geologists should be allowed to influence the classification and nomenclature of rocks, or should there be a simple classification with field-names for general use, and a more complete classification with more exact names for use in accurate petrography.

W. CAMPBELL SMITH,
Chairman.
A. K. WELLS,
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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE DEVICE FOR ADDING LOAD AT A STEADY RATE

THE firmness or resistance to crushing of apples, pears and other fruits has been found to be a useful index of their maturity and suitability for harvest. To obtain this firmness in the form of a number mechanical devices are used. The time of harvest of green peas for canning is an extremely critical factor in the quality of the canned product and therefore an effort has been made at this station to devise a similar test for peas.[1] The spring balance used did not give the degree of precision desired, and the reading was visible for such a short time that it was likely to be misread.

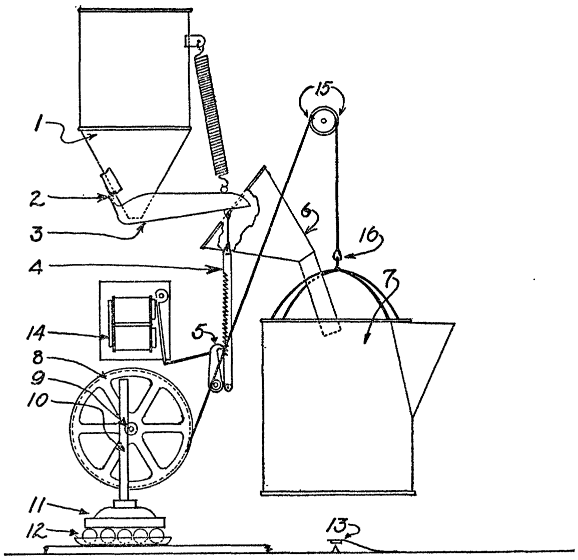
In this work and in a similar test to determine the toughness of peas after canning[2] it has been thought to be necessary to add the load at a constant rate until the peas collapsed. To serve this purpose a dispensing burette of glass filled with mercury has been recommended.[2] Obviously mercury is open to objections on account of its cost and toxicity, to which must be added the fact that it is a liquid and therefore will flow more rapidly at a given position of the glass stopcock when the burette is nearly full than when it is nearly empty.

The device illustrated has certain advantages for this test and any similar test where the application of a load at a constant and reproducible rate up to fifty pounds (25 kilos) is desired. It is not essentially new, since it resembles a common device for determining the tensile strength of Portland cement. It uses alternatively lead shot or any other round pellets, and depends upon the fact that the flow of these through an opening under their own weight is easily stopped.

As a reservoir for the shot a cylindrical container is provided with a bottom in the shape of a cone of preferably less than 60°. The tip of the cone is cut off by successive trials until the opening left is just

[1] N. Y. Agr. Exp. Sta. (Geneva) Tech. Bull., 176, 1931.

[2] U. S. Department of Agriculture Circular No. 164, 1931.



1, Reservoir for lead shot; 2, hinge; 3, movable pouring spout; 4, ratchet for holding spout at a given angle; 5, pawl to engage with ratchet bar 4; 6, guide funnel to direct shot into bucket 7; 7, detachable shot bucket; 8, grooved pulley; 9, pinion coaxial with pulley 7; 10, rack bar driven by pinion 9; 11, platen of glass which crushes peas; 12, receptacle for peas; 13, electrical contact for stopping shot at a predetermined position of the bucket; 14, electro-magnet which lifts pawl 5; 15, braided steel wire passing over pulley; 16, wire loop and hook for detaching bucket for weighing. It should be mentioned that parts 8, 9, 10, 11 and 12 are the essential parts of the device for determining the crushing value of peas described in N. Y. Agr. Exp. Sta. Tech. Bulletin 176, (Geneva) p. 12.

too large to be stopped up by the wedging of the shot or "bridging over." There is some latitude in its size, but it should be neither too large nor too small. One that has been found satisfactory for air rifle shot is 18 mm in diameter and will pass a dime but will retain a nickel.

Below the funnel a pouring spout is fastened by a hinge, so that shot passing through the funnel opening forms a pile upon its floor. This pile of shot grows until it surrounds the opening, whereupon the flow of shot from the reservoir is checked. If the inclination of the spout does not allow the shot to run out, the movement of shot from the reservoir stops instantly and completely. If the spout is tilted so that shot roll out the size of the pile is maintained from the reservoir, and a remarkably regular flow is kept up from the tip of the spout as long as there is any shot in the reservoir. A wide range of choice of rates of flow was found to be possible. The notches on the bar shown in the figure for holding the spout in any given position are 5 mm apart.

For an automatic cut-off the spout may be pulled back to the "off" position by the release of a spring. To prevent the violence of this motion from spilling some of the shot in the spout this is covered almost to the tip, and a suitably designed guide funnel is provided to direct all the shot that leaves the spout into the weighing bucket.

The drawing illustrates a device of this sort that was used with a previously described crushing tester for peas throughout an active season without requiring attention from the operator. The load reading is taken by detaching the bucket at leisure and weighing it upon a platform balance. It is emptied into the reservoir before attaching again and a pour-out is provided to make this more expeditious. It is not necessary to touch the shot with the hands.

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VOLTAGE-FREQUENCY RELATIONSHIPS IN ACTION CURRENTS

THE common method for studying action currents has been to record photographically their frequencies, amplitudes and phase angles. It has yielded noteworthy results. However, certain questions have arisen not only in regard to the interpretation but also in connection with the reading of such recordings. The most of us have read the time interval between successive peaks in the wave train in order to obtain the frequency. This method is both inaccurate and inadequate. Granted that pictorially all the fundamental frequencies and their harmonic contents are present there is no known method for reading a non-repeating electrical wave such as we have represented in the action currents of nerve and muscle. In the vast majority of our action current records we could not fit even approximately a Fourier Series which proceeds by sines or cosines or multiples of a variable.

There is a method which overcomes, partially at least, the difficulties confronting us in a wave analysis of action currents. It amounts to determining what proportion of the total voltage generated lies within a certain frequency band. The frequency-intensity-phase angle relationships are·thus resolved into a common denominator, voltage which for practical purposes may be thought of as power. Power equals the voltage squared divided by resistance and as we may hold the latter constant the voltage may be read as a direct expression of power. This unit of analysis is not only accurate but practical.

We have used two three-stage amplifiers, one of the resistance and the other of the impedance coupled type, a filter circuit and an alternating current volt-