2. The defunct American Federation of Teachers of the Mathematical and Natural Sciences and the Botanists of the Central States were dropped from the list of affiliated societies.

3. A constitutional amendment to permit each division to name two council representatives was ordered brought before the council at Atlantic City.

4. The proposal that the association cooperate with Sigma Xi in commemorating the fiftieth anniversary of its founding at Cornell University was discussed and the permanent secretary was asked to secure from the society possible alternatives for such cooperation for consideration at the next meeting of the Executive Committee.

5. The resignation of Dr. A. G. McCall as auditor was accepted and Dr. W. J. Humphreys was elected auditor.

6. The executive assistant was authorized to sign checks drawn against the checking account No. 1 of the Association in the American Security and Trust Company. In the absence or inability of the executive assistant the checks are to be signed by the permanent secretary. A joint bond of $20,000 to cover the responsibility of the executive assistant and the permanent secretary was ordered.

7. $15,000 now in the reserve funds of the office of the permanent secretary were ordered transferred to the treasurer for investment in such a manner as to remain subject to the order of the officers of the association. The permanent secretary was authorized to invest $5,000 in U. S. Treasury Certificates, purchase to be made from reserve funds of the office of the permanent secretary. The balance of the permanent secretary's reserve funds were ordered deposited in savings accounts of two Washington banks.

8. A report on the Hector Maiben bequest from Mr. Wm. G. Long, Seattle attorney, was accepted. It was reported that the appraised value of the estate, fixed by the court, amounted to $37,833.40. Inheritance tax and administration fees will be deducted from this amount. An honorarium of $150 was voted for Mr. Wm. G. Long in appreciation of his services, this sum to be paid from the treasurer's current funds. Mr. Ben Maiben, brother of Hector Maiben, was appointed as the association's local representative in Nebraska with authority to act in all cases where problems or exigencies may arise in connection with securities on property in Nebraska obtained through the will of his brother.

9. In memory of Hector Maiben, a Hector Maiben lecture to be given each year at the annual (winter) meeting of the association was established. This lecture will carry an honorarium of $200 and traveling expenses for the lecturer. The first Maiben lecture will be held at Atlantic City.

10. The expenses of the secretary of the academy conference in attending the annual meeting were authorized to be paid on the same basis as expenses of section secretaries.

11. It was voted that members of the executive committee attending the meetings of the committee at Syracuse will be expected to pay their own expenses.

12. It was voted to pay expenses of only those section secretaries who take an active part in arranging programs for the Syracuse meeting.

13. A new half year membership at one half the regular annual dues was authorized for those joining the association between April 1 and October 1. Such new members will receive a journal subscription for the six months beginning July 1. Members joining under this plan will be billed for a regular year's membership at the time of the October billing.

14. An additional appropriation of $649.12 was made to cover over-expenditures of the Science Exhibition committee at New Orleans. Total expenditures were reported as $3,149.12.

15. A letter from Dr. Otis W. Caldwell, chairman of the Committee on the Place of Science in Education, was read, recommending that the committee be discharged, and that the unexpended balance of the committee's funds be held in the association's reserves. The report was accepted and the permanent secretary was asked to confer with Dr. Caldwell.

16. The president and the chairman of the executive committee were asked to select a delegate to attend the meeting of the British Association for the Advancement of Science to be held in York, England, August 31 to September 7.

17. It was voted to hold the next fall meeting of the executive committee in Atlantic City on the third Saturday and Sunday in October.

18. The committee adjourned to meet in Syracuse on June 20.

CHARLES F. ROOS,
Permanent Secretary

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SHORT METHOD FOR CALCULATING MOISTURE PERCENTAGES[1]

THE determination of moisture is an essential part of many analytical procedures and the calculations involved are somewhat tedious. Careful checking is required to prevent errors. The use of a calculating machine naturally increases the speed and accuracy of the work. In connection with a large number of routine analyses, a short method of computing moisture percentages with the aid of a calculating machine

[1] Approved for publication by the chief, U. S. Bureau of Chemistry and Soils.

was devised which may be of interest to others. This method reduces the time required since only four figures need be recorded in the machine until the moisture percentage is obtained. By any other method familiar to the author, seven to nine operations and the writing down of intermediate figures are necessary. The method can best be explained by means of an example, in which it is assumed that an 8 row, 3 dial machine is available. Minor differences in other makes and models of calculating machines, particularly, a different number of rows of keys, introduce slight modifications in technique which should be obvious to an experienced operator.

Problem: What is the moisture content, on a dry weight basis, of a sample of soil, the following data having been obtained in the laboratory?

Weighing bottle + air-dry soil	32.5868 grams
Weighing bottle + oven-dry soil	32.3676 grams
Weight of empty weighing bottle	29.3306 grams

Procedure: During the operations, put all numbers on the right-hand side of the keyboard, maintaining a constant position for the decimal point. Move the pointers over the dials to the positions shown by the arrows in order to indicate the position of the decimal point during the operations. Move the carriage as far as it will go toward the right and put the weight of the bottle plus air-dry soil in the carriage dial. The dials then appear as follows:

```
      ↓                 ↓
0 0 3 2 5 8 6 8   1 0 0 0 0 0 0 0
        ↓                 ↓
0 0 0 3 2 5 8 6 8 0 0 0 0 0 0 0 0
```

Next move the carriage as far as it will go toward the *left* and put the weight of the bottle plus oven-dry sample on the *right* side of the carriage dial:

```
      ↓                 ↓
0 0 3 2 3 6 7 6   1 0 0 0 0 0 0 1
        ↓                 ↓
0 0 0 3 2 5 8 6 8 0 3 2 3 6 7 6
```

Now put the weight of the empty weighing bottle on the keyboard and subtract it from each set of figures by sliding the carriage from one end to the other, and subtracting with the carriage at each end. The dials now show:

```
      ↓                 ↓
0 0 2 9 3 3 0 6   0 0 0 0 0 0 0 0
        ↓                 ↓
0 0 0 0 3 2 5 6 2 0 0 3 0 3 7 0
```

These figures in the carriage dial are the weights of the air-dry and oven-dry samples, respectively, and need not be noted unless desired. Clear the keyboard and put the weight of the oven-dry sample (the figures on the right-hand side of the carriage) on the keyboard and subtract from both sides as explained above. If no mistake was made in transferring the figure, the numbers on the right side of the carriage become zero, thus automatically checking the transferred number, and those on the left represent the loss in moisture of the sample. The dials at the end of this operation appear as follows:

```
      ↓                 ↓
0 0 0 3 0 3 7 0   8 9 9 9 9 9 9 9
        ↓                 ↓
0 0 0 0 0 2 1 9 2 0 0 0 0 0 0 0
```

The machine now has the weight of the moisture near the left center of the carriage dial and the weight of the oven-dry sample on the keyboard, thus it is correctly set for dividing the first by the second to obtain the percentage of moisture. Clear the *upper right-hand* dial before starting the division, which is performed in the usual manner. In the example given, the moisture content is 7.217 per cent.

This figure, plus 100.0 per cent., gives a factor by which all other analytical data, expressed in percentage of the fresh sample, can be converted to percentage on the dry-weight basis. Thus if the silica content of the soil in the preceding example is 61.54 per cent. on the basis of an air-dried sample, it is 61.54×1.0722, or 65.98 per cent., on the oven-dry basis.

The operation is the same for samples containing over 100 per cent. moisture, expressed on a dry-weight basis. In this case, however, the factor for converting the fresh-weight to dry-weight percentage is correspondingly large. For example, if the dry-basis nitrogen percentage of a sample of soy-beans is desired and the moisture and nitrogen determinations of the fresh material gave the following data,

Weighing bottle + fresh plant	45.2768 grams
Weighing bottle + dry plant	32.9884 grams
Weight of empty weighing bottle	29.3306 grams
Nitrogen, fresh-weight basis	0.58 per cent.

the calculation of the moisture content gives 335.95 per cent. on a dry-weight basis and the conversion factor is therefore

$$3.3595 + 1.0000 = 4.3595,$$

hence the nitrogen content on the dry-weight basis is

$$.58 \times 4.3595 = 2.53 \text{ per cent.}$$

With the increasing dependence upon machine calculation, simplified methods similar to this have probably been devised by other investigators, although a limited search of the literature has failed to disclose published references. Therefore the above method is offered to those who may be interested in a simple,

rapid and accurate procedure for handling moisture calculations.

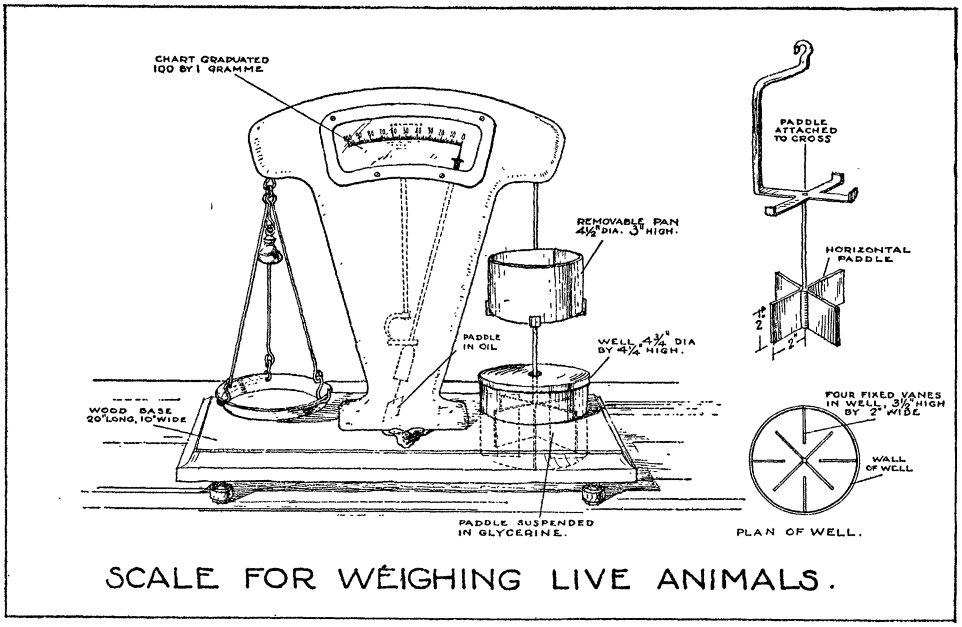
NELSON MCKAIG, JR.
BUREAU OF CHEMISTRY AND SOILS,
U. S. DEPT. OF AGRICULTURE,
HOUMA, LOUISIANA

A BALANCE FOR LIVE ANIMALS

CERTAIN experiments in this laboratory have necessitated recording every week the weight of large numbers of rats. A spring balance was found to be unsatisfactory for two reasons, it does not read correctly over a range of 0 to 400 grams, and the movements of a rat on the pan cause such wide oscillations of the pointer that accurate reading is impossible. An ordinary beam balance has the additional disadvantages of being slow in operation because of the time required to manipulate weights, and of being even more affected than the spring balance by the movements of the rat.

The addition of a simple attachment to a commercial direct-reading beam balance gave such satisfactory results that we believe other workers may be glad to have a description of the device. The balance is one of those commercial balances of 1 kilo capacity, reading directly from 0 to 100 grams in one gram intervals, in which the oscillations of the beam are damped by a paddle attachment immersed in oil. Such a balance is most useful for general laboratory purposes, and even for weighing animals. Its performance may be considerably improved, however, by additional damping to overcome the oscillations caused by movements of the animal on the scale pan. We have achieved this by attaching to the underside of the scale-pan a paddle immersed in oil. This successfully damps the sideways or rotatory oscillations. A cup-shaped pan was adopted because rats move about in it very much less than on the ordinary scale-pan. The oscillations of the pointer due to movements of a rat are in this way practically eliminated.

As many as three hundred weighings of rats, accurate to within 1 gram, may, with this apparatus, be made easily in one hour.



SCALE FOR WEIGHING LIVE ANIMALS.

Messrs. W. and T. Avery, of Toronto, who are the makers of the commercial balance which we have adapted, were good enough to construct the additional attachments for us.

BRUCE F. CROCKER
HARDOLPH WASTENEYS
DEPARTMENT OF BIOCHEMISTRY,
UNIVERSITY OF TORONTO

SPECIAL ARTICLES

THE CHEMICAL STUDY OF INSULIN[1]

CRYSTALLINE insulin was first prepared by Abel in 1926.[2] Since then it has been of the greatest interest to ascertain the chemical structure of this substance, which plays so important a rôle in carbohydrate

[1] No. 13 of the series "Studies on Crystalline Insulin." Investigations carried out under grants from the Carnegie Corporation of New York and the Eli Lilly Company, Indianapolis, Indiana.

[2] J. J. Abel, *Proc. Nat. Acad. Sci.*, 12, No. 2, 132, 1926; Abel, Geiling, Rouiller, Bell and Wintersteiner, *J. Pharmacol. and Exp. Therap.*, 31, 65, 1926.