REPORTS

FOREIGN RELATIONS OF THE NATIONAL ACADEMY OF SCIENCES

THIS report for the year 1928–29 is, as usual, the report of one of your officers in his dual capacity as foreign secretary of the academy and chairman of the division of foreign relations of the National Research Council. The activities of the past year may be summarized as follows:

1. The sections of the academy have been canvassed for suggestions as to nominations of foreign associates, and five new foreign associates have been nominated. If these are all elected the total number of foreign associates will be 47, which lacks but 3 of the constitutional limit. Of these, 8 are in mathematics, 6 in astronomy, 7 in physics, 3 in engineering, 3 in chemistry, 6 in geology, 4 in botany, 5 in physiology and pathology, 4 in zoology and anatomy and 1 in anthropology and psychology.

2. Arrangements have been completed for the joint participation of the French Academy, the Royal Society of Great Britain and the National Academy in the establishment of the Charles Doolittle Walcott medal and in the selection of medalists.

3. A large amount of correspondences and committee action has been carried on from the office of the secretary of the division of foreign relations of the National Research Council in connection with the participation of the United States in the Fourth Pacific Science Congress to be held in Batavia and Bandoeng, Java, between May 16 and 24. Twenty-seven representative American scientists are now voyaging over the Pacific to this congress.

4. Arrangements have been made for American participation in the fifteenth International Geological Congress to be held in Pretoria, South Africa, between July 29 and August 7. Eight American geologists have been appointed as delegates and other geologists from this country are also planning to attend the congress, bringing the total number of American participants in the congress up to fifteen. Plans have been initiated for holding the sixteenth International Geological Congress in the United States in 1932.

5. Arrangements have been made for the representation of the United States in the International Congress of Oceanography and Marine Hydrography and Continental Hydrology, which will be held between May 1 and 6 in Seville, Spain, in connection with the Ibero-American Exposition. Mr. George W. Littlehales has been named as the representative from the National Research Council and the National Academy at this congress.

6. Because of the relationships of the academy to the government on the basis of its congressional charter, the officers of the division of foreign relations of the Research Council and the officers of the academy have been able to arrange for the payment of the dues of the various unions, to which the Research Council has adhered, through congressional appropriation. The total amount which has been appropriated for this purpose for the current year (1928–29) was $4,480, but on account of recent changes in the dues and in the value of the franc the National Research Council has been obliged to make a supplementary appropriation for the payment of these dues to the amount of about $1,348.70, thus bringing the total sum appropriated by the government, together with the appropriation from the Research Council, for the payment of American dues in international scientific unions up to about $5,800. It is hoped and expected that in future these dues will be wholly met by the government appropriation. This very substantial assistance to American science on the part of the government is made possible solely through the academy's official status. The unions sharing in the foregoing advantages are:

International Astronomical Union
International Geodetic and Geophysical Union
International Union of Pure and Applied Chemistry
International Mathematical Union
International Union of Pure and Applied Physics
International Union of Radio Telegraphy
International Geographical Union.

7. Through the division of foreign relations of the National Research Council, American opinion has been obtained and a set of specific proposals formulated with respect to a modification of the statutes of the International Research Council. At the general assembly of this body held in Brussels on July 13, 1928, a committee of fifteen members was appointed and charged with the task of formulating proposals for such a modification. Sir Henry Lyons, of the Royal Society, is secretary of this committee and Dr. Frank Schlesinger, director of the Yale University Observatory, and Dr. Vernon Kellogg, permanent secretary of the National Research Council, are its American members.

The division of foreign relations after prolonged discussion has adopted and transmitted to this committee for its information and guidance a definite set of recommendations embodying, in so far as the division of foreign relations has been able to obtain and express it, current American opinion. The full text of these recommendations is contained in the report of the division of foreign relations on file in the office of the National Research Council. Mimeographed copies of this report have been distributed to academy members.

The most significant recommendations of this report are contained in the following paragraphs quoted from this statement:

1. That the International Research Council should be continued.

2. That the statutes of the International Research Council should be entirely rewritten rather than merely amended in certain respects.

3. That in rewriting these statutes the committee on revision of the statutes shall call into conference for advisory purposes representative scientists of countries not now adhering to the International Research Council.

4. That it would be desirable that the new organization be known not as the International Research Council but as the International Federation of Scientific Unions.

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Foreign Secretary of the
APRIL, 1929 *National Academy of Sciences*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

APPARATUS FOR THE DETERMINATION OF CARBON DIOXIDE IN THE RESPIRATION OF APPLES

A REVIEW of the various methods adopted for the determination of the rate of respiration in apples as measured by carbon dioxide evolution discloses the fact that most investigations involve rather small quantities of the product used. When the amount of fruit used is not over three to four kilograms (twenty to thirty apples) it is almost impossible to avoid high experimental error, due largely to the variation in maturity of individual fruits. Recent investigations by Kidd and West[1, 2] show a wide variation in respiratory activity of single apples taken from the same sample. By the use of the pickle-bottle respiration chamber[3] in which eight to nine kilograms of fruit (sixty-five to seventy apples) of approximately one half of a standard apple box in size were used, a method of carbon dioxide determination was devised which was efficient and sufficiently unique in its adaptation to warrant a brief description.

DETAILS OF THE APPARATUS

The apparatus used for the determination of carbon dioxide as a measure of respiration is shown in Plate 1. Air was drawn through two wash-bottles, 1 and 2, containing 50 per cent. potassium hydroxide. It was then bubbled through Ba $(OH)_2$, 3, as a check for small amounts of carbon dioxide. Connections with the respiration chamber, 4, were made with copper tubing in such a way as to draw the carbon dioxide-laden air from the bottom of the bottle. At the points B and C, "Y" tubes were placed in order that the air-stream might be directed either through the absorption tower for the measurement of carbon dioxide or directly to the flow-meter in case continuous aspiration was desired without measuring the carbon dioxide. A simple manipulation of the steel clamps permitted the air to pass through either system.

This system was further desirable because it made possible the removal of carbon dioxide which might have accumulated in the respiration chamber previous to a determination. By this means it was also possible to make connections with the absorption tower with only a momentary stoppage of the air-stream. Where total carbon dioxide was desired, two absorption towers were used, and at the end of one determination the air current was directed through the second tower, through connections previously made. By this method, continuous aspiration was practically

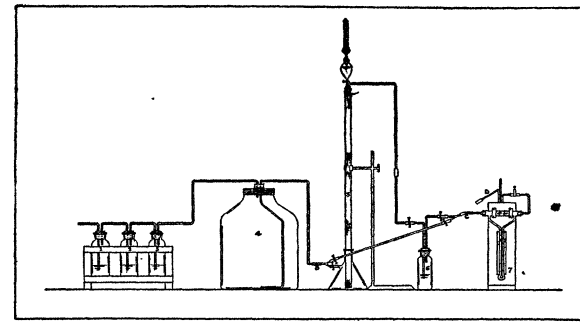

Plate I. Apparatus for the determination of CO_2 as a measure of respiration.

accomplished with no loss and very little accumulation of carbon dioxide in the respiration chamber.

Carbon dioxide was absorbed in a Truog Absorption Tower,[4] 5. Bottle No. 6 contained barium hydroxide and served to indicate whether carbon dioxide was passing off unabsorbed. A flow-meter, 7, was

[1] Franklin Kidd and Cyril West, "The Storage Life of Apples in Relation to Respiratory Activity and Chemical Composition," Report Food Investigation Board, pp. 37–57, 1925–1926.

[2] Franklin Kidd and Cyril West, "Fruit and Vegetables," Report Food Investigation Board, Section B, pp. 23–27, 1927.

[3] T. J. Maney, P. L. Harding and H. H. Plagge, "A New Type of Respiration Chamber," SCIENCE, 70, p. 44, 1929.

[4] E. Truog, *Journal of Industrial and Engineering Chemistry*, Vol. 7, No. 12, p. 1045. Dec., 1915.