REPORTS

THE ROCKEFELLER FOUNDATION[1]

DURING 1938 The Rockefeller Foundation appropriated a total sum of over $15,000,000. Of this amount, speaking in terms of rough classifications, $3,800,000 was given to the medical sciences, $3,800,000 to the social sciences, $3,000,000 to the natural sciences, $2,500,000 to public health, $1,000,000 to the humanities and $300,000 to rural reconstruction in China.

The foundation's income during 1938 amounted approximately to $7,000,000. In appropriating $15,000,000 it was necessary, therefore, not only to use up the balance carried over from earlier years, but to dip into the principal fund to the extent of $3,755,000.

In carrying out its 1938 program the foundation operated in forty-two countries in all parts of the world. Eighteen of these countries were in Europe, five in Asia, two in Africa, five in South America, ten in North and Central America and the West Indies and two were islands of the Pacific.

Twenty-five per cent. of the money given went to foreign countries, and the remainder, 75 per cent., was for work in the United States.

It was found advisable in 1938 to make large appropriations to four different institutions. Two of these grants were for current support over extended periods, and two were for endowment. These account, in part, for the relatively large total of funds appropriated during the year. To the China Medical Board, the foundation gave $1,580,000, under an earlier authorization, for expenditure over a period of approximately four years. Previously the foundation had made annual appropriations to this board toward the maintenance of the Peiping Union Medical College. Support over a relatively long period has now been given to enable both the board and the college to plan with reasonable assurance for the immediate future.

To the University of Chicago, the foundation appropriated $1,500,000 for the endowment of biological research. The foundation has made grants for the current maintenance of this work for a number of years, and the program has so clearly demonstrated its quality that stabilization of foundation support seemed wise.

To the American University of Beirut, the foundation appropriated $1,000,000 toward the endowment of its medical school, including nursing and premedical subjects. This action has been in contemplation for a number of years, and it is now believed that the university is in a position to raise the supplementary sums required and thus make a substantial addition to its resources.

To the Spelman Fund of New York, the foundation appropriated $2,000,000 for use over a five-year period in support of the fund's program in public administration. Both the foundation and the Spelman Fund are interested in research and training in public administration. The foundation has given assistance to academic institutions; the fund to non-academic institutions. The latter type of program promises significant results and inasmuch as the resources of the Spelman Fund were practically exhausted, the foundation made it possible for this experienced organization to continue its work over the next five years.

Among other large appropriations and pledges made during the year were the following:

Yale University: toward support of the Institute of Human Relations	$700,000
Washington University School of Medicine (St. Louis): for the maintenance of its departments of medicine, surgery, pediatrics and obstetrics	400,000
Graduate Institute of International Studies, Geneva: toward its general expenses	315,000
State Institute of Public Health, Stockholm: half the cost of construction and equipment	270,000
University of Toronto School of Nursing: endowment	255,000
University of North Carolina: for work in drama: endowment ($150,000); current expenses ($33,000)	183,000
Social Science Research Council: for conferences and planning in connection with research in the social sciences	150,000
University of Chicago: for support of psychiatric teaching and research	150,000
The Johns Hopkins University School of Medicine: toward support of the Institute of the History of Medicine	150,000
Washington University School of Medicine: for support of the Department of Neuropsychiatry	150,000

Except in the field of public health, the foundation is not an operating organization. It conducts no researches of its own. Its activities are confined to grants to other agencies—universities, laboratories and research institutes—and to the training, through fellowships, of competent personnel in the various fields of knowledge.

[1] From review of work in 1938 by Raymond B. Fosdick, president.

SPECIAL ARTICLES

THE DETERMINATION OF ETHYLENE EVOLVED BY APPLES AND PEARS

THE methods described herewith have been developed to fulfil the need for an accurate chemical means for determining the small amounts of ethylene produced by apples and pears. Although several estimations of the amounts of this gas emanating from certain fruits have

been made[1, 2] the procedures used are not adapted to small experimental lots of fruit such as are commonly employed in physiological investigations.

In preliminary studies undertaken, it was considered desirable to determine whether or not saturated hydrocarbon gases as well as ethylene were present in the vapors emanating from the fruit. For this purpose, a method was used by which the evolved hydrocarbon gases were combusted before and after bromination. The apparatus designed for this experiment is shown in Fig. 1.

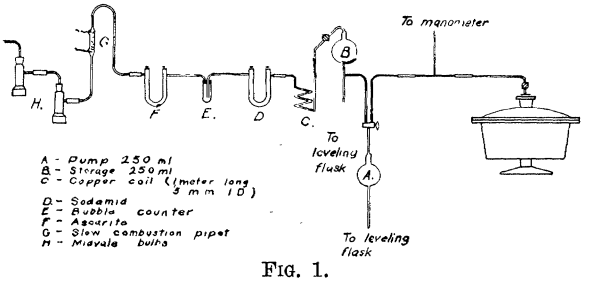

FIG. 1.

The procedure used in making this determination was as follows.

Approximately 1.5–2 kg of fruit, together with 200 ml of 15 per cent. KOH were placed in each of several desiccators, which were then connected to an oxygen supply. After standing for a given period of time at a temperature of 65 degrees F., the KOH was removed and 5 ml of 28 per cent. ammonia solution (to remove acetaldehyde) were introduced into the vessel and allowed to react for one hour. The vapors were then transferred by means of a Topler pump into another container.

The aldehyde-free gas was then equally distributed in two evacuated desiccators. The unsaturated hydrocarbons in one of the vessels were brominated by the addition of 2 ml of liquid bromine. The total hydrocarbons present in the other container were determined by the following procedure.

The gases were extracted from the desiccator by the Topler pump "A" (Fig. 1) and forced into the gas reservoir "B," which was maintained at a slight pressure. By adjusting the stopcock at the top of "B," a constant flow of one liter per hour could be maintained through the analytical train during the entire course of the extraction.

Before the hydrocarbon gases could be oxidized, it was necessary to remove all traces of other organic vapors. This was accomplished by passing the gases through a purification train consisting of a copper coil "C" immersed in a dry ice-ether mixture, a sodamide tube "D," a bubble counter "E," containing phosphoric acid, and an ascarite tube "F." The hydrocarbons, then being the only organic substances left, were oxidized by means of a hot platinum spiral "G,"[3] and the CO_2 resulting was then collected in the Midvale bulb "H" and weighed. This gave the total hydrocarbon content of the vapors. Blank determinations showed that ethyl acetate, ethyl alcohol, ethylene dibromide and acetaldehyde were removed completely by the purification train used, while ethylene passed through and was determined quantitatively.

The vessel containing the brominated vapors was next connected to the analytical train and the gases forced through as described. The excess bromine was removed by a 20 per cent. KOH solution contained in a bubble counter placed between the pump and the desiccator. The data from this experiment gave the saturated hydrocarbon content, the unsaturates being obtained by difference.

Both apples and pears were treated by the above procedure. The results of these determinations before and after bromination show that very little, if any, saturated hydrocarbons occur in the gases evolved by the fruits used. The amounts of unsaturated hydrocarbons (as ethylene) produced by these fruits during ripening are shown in Fig. 2.

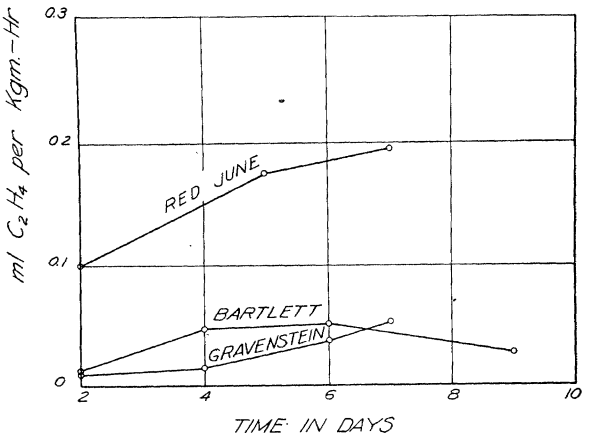

FIG. 2. Ethylene produced by apples and pears at 65° F, determined by slow-combustion method.

Since ethylene or similar olefins appear to be the only hydrocarbon gases present in the fruits used, investigations were undertaken to develop a method by which these could be rapidly and accurately determined. For this purpose, a micro-method was developed by which the ethylene can be determined in a 35 ml gas sample withdrawn from the desiccator at regular intervals during the course of the experiment.

[1] R. Gane. *Jour. of Pomol. and Hort. Sci.*, 13: 351, 1935.

[2] Joseph B. Niederl and Mortimer E. Brenner, *Mikrochemie*, 24: 134–145, 1938.

[3] Bert E. Christensen and Robert Carleton. *Ind. and Eng. Chem. (Anal Ed.)*, 9: 400, 1937.

Using this procedure, the amounts of ethylene produced by several varieties of apples have been determined and are shown graphically in Fig. 3. This

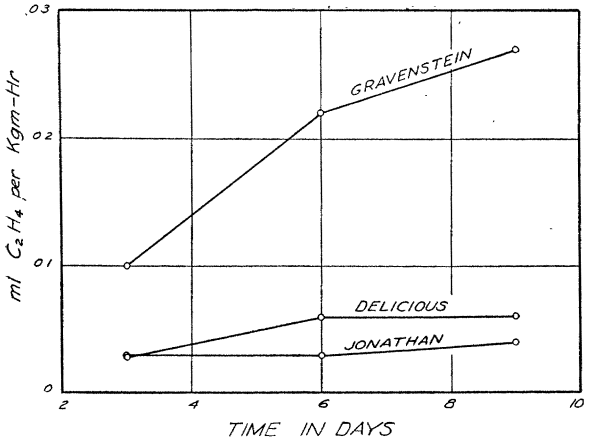

FIG. 3. Ethylene produced by 3 varieties of apples at 65° F, determined by micro-bromination method.

method has the distinct advantage in that a small amount of fruit can be enclosed in a vessel and the ethylene evolved accurately and rapidly determined at regular intervals during the course of any experimental treatment to which the fruit may be subjected. A detailed description will be presented in a forthcoming publication.[1]

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ROLE OF HORMONES IN THE SEXUAL REACTION OF HETEROTHALLIC ACHLYAS

THIS communication, a preliminary report of experimental work on an undetermined species of *Achlya*, a genus of the Saprolegniales, more clearly establishes the role of hormones as activators and coordinators in the sexual reaction in the phycomycetous fungi. These hormones, or specific sexual substances, would fall into the group of diffusion hormones or diffusion activators according to the classification of Huxley.[1]

The sexual reaction in this heterothallic species is under hormonal control at least until the time of the formation of the basal wall of the oogonium. In the time which elapses between the approximation of the ♂ and ♀ mycelia and the formation of the basal wall of the oogonium, four specific substances are involved: two produced by the ♀ initiating specific responses in the ♂, and two produced by the ♂ bringing about specific reactions in the ♀. These hormones and their specific actions are summarized in Table 1:

TABLE 1*

Hormone	Produced by	Affecting	Specific action(s)
A	♀-vegetative hyphae	♂-vegetative hyphae	Induces formation of antheridial branches
B	♂-Antheridial branches	♀-Vegetative hyphae	Initiates the formation of oogonial initials
C	♀-Oogonial initials	♂-Antheridial branches	(1) Attracts antheridial branches (2) Induces, in connection with a thigmotropic response, the delimitation of antheridia
D	♂-Antheridia	♀-Oogonial initials	Brings about the delimitation of the oogonium by the formation of a basal wall

* See Fig. 1.

The evidence for these specific substances may be considered under a number of headings as follows:

(1) The sequence of events and the time intervals involved indicate a hormonal coordinating mechanism (see diagram). The time intervals may be varied by changing environmental conditions, but they always

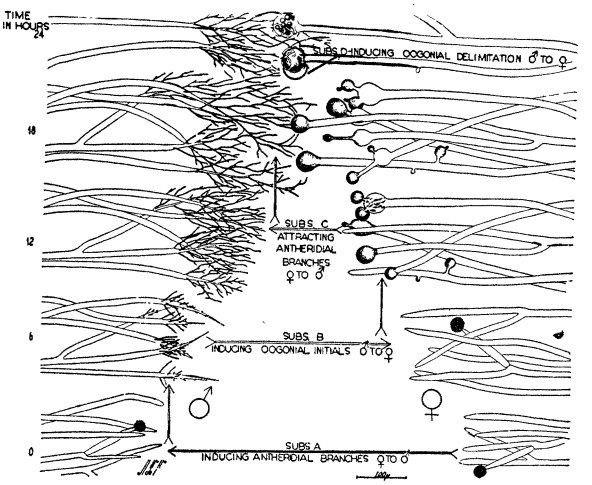

FIG. 1

remain proportionately the same and no change in the sequence has ever been observed.

(2) Telomorphotic (distance) responses regularly occur in both ♂ and ♀. (The formation of antheridial hyphae, the first step in sexual reaction, often occurs in a mating on a nutrient agar media when the ♂ and ♀ mycelia are as much as 6 mm apart, a distance 7.5 times greater than that shown in the accompanying diagram). These distance reactions, all essentially similar, have been observed in the following experi-

[1] Published with the approval of the Monograph Publication Committee, Oregon State College Research Paper No. 14.

[1] J. S. Huxley, *Biol. Rev.*, 10: 1935.