

ard. (In order to maintain the sealing of the joints it is better, when possible, not to bring the pressure within the respirometer fully up to the atmospheric.) The aeration is now discontinued, but the rocking kept up. The rate of CO_2 production is recorded in terms of time necessary to effect a definite change of color of the bicarbonate (in F), or by allowing a definite time to elapse, and comparing the color of the bicarbonate attained at that time with a set of standards. The computation of the CO_2 resulting is made in a manner described by Ray.³ In certain instances a part, or even all the CO_2 produced, is consumed in producing carbonates, in which cases, after the experiment has proceeded for a certain time, one removes the cotton plug and, having filled the bulb (B) with acid, permits a small amount of the acid to enter the inner chamber (E), thus liberating the CO_2 . At this time rocking is resumed and continued, until the color of the indicator no longer changes. The actual amount of CO_2 produced will be represented by the difference between the total CO_2 liberated in two succeeding determinations, the first serving as a control for the second.

In the case of the bacteriophage, the last of the steps described was omitted, since it was found possible to acidify the solution (up to $\text{CH} = 3 \times 10^{-5}$), before placing it in the respirometer, without affecting the activity of the bacteriophage. The acidified bacteriophage solution proved to be as potent at the end as at the beginning of the test.

A large number of experiments was made with different types of bacteriophage, and in none was any indication of CO_2 production obtained.

For the study of anaerobic respiration, 1 per cent. of glucose and a drop of indicator⁵ are added to the bacteriophage solution before it is placed in the respirometer. Should production of non-volatile acid occur, it will be indicated by the change in color of the bacteriophage solution itself. The change in color in the outer tube indicates the production of volatile acid. In the case of bacteriophage there is no change in the color of the indicator in either chamber.

J. BRONFENBRENNER

THE ROCKEFELLER INSTITUTE FOR
MEDICAL RESEARCH,
NEW YORK

INHERITANCE OF ANTHOCYANIN IN CREPIS

A REDDISH purple pigment assumed to be anthocyanin is present in varying degrees in plants of all the

⁵ Bronfenbrenner, J., *Jour. Med. Res.*, 39, 25, 1918.

(This indicator is preferred because it is less subject to reduction.)

species of *Crepis* which have been examined. Selection in *C. capillaris* (L.) Wallr. gave races differing considerably in the amount of pigment present, but no plants have appeared in which anthocyanin was completely absent. When races differing in the amount of pigment were crossed, the F_1 and F_2 results were those generally described as due to a number of genes conditioning the appearance of a single character. Two selected inbred strains appeared to differ in only two genes, giving a 9 to 7 ratio in F_2 .

In view of our results regarding this pigment in *capillaris*, the discovery in 1923 of a single pure green plant in a culture of *C. Dioscoridis* L. is noteworthy. When crossed with the common pigmented type, the F_1 was fully pigmented. The following data from F_2 cultures indicates this difference between pigmented and non-pigmented is conditioned by a single gene:

Culture No.	Purple	Green	Total
25.12	15	4	19
25.14	19	7	26
25.15	69	27	96
Total	103	38	141
Calculated	105.75	35.25	141
Difference	2.75 $\pm$ 3.47		

The amount of anthocyanin varies considerably in different plants of *Dioscoridis*. No attempts have been made to select extreme races comparable to those secured in *capillaris* to determine whether the different degrees of pigmentation are determined by different genes affecting this character. The results in *Dioscoridis*, however, show that one main gene conditions the production of any pigment. There are probably modifying genes that influence the amount of anthocyanin which a plant may develop in the presence of the main pigment-determining gene.

The single green plant among twenty plants of the 1923 culture was evidently the result of a gene mutation, but whether it occurred in a single gene of some ancestral plant and appeared after the chance union of two gametes carrying the recessive gene or whether it occurred after the fertilization which produced this particular plant is hard to determine. Progenies from purple sibs of the green plant failed to produce any more green plants, as would be expected if it had appeared as an extracted recessive.

No difference could be observed between the development and vigor of the green plants and those having anthocyanin.

J. L. COLLINS

UNIVERSITY OF CALIFORNIA