the chemical and physical nature of the component parts.

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On the Relationship between the Bilateral Asymmetry of the Unilocular Fruit and the Weight of the Seed which it Produces

The problem of symmetry, radial and bilateral, is of such great interest that it can not be approached from too many angles. The purpose of the present note is to discuss on the basis of a rather extensive series of quantitative data the question: "Do bean pods with an 'odd' number of ovules produce lighter seeds than those with an even (2, 4, 6, etc.) number?" Here the "odd" or "even" character of the pod is to some extent an index of bilateral asymmetry. Pods with an odd number of ovules must have them unequally divided between the two carpellary margins which form the ventral suture, while those with an even number generally have them equally divided. Thus with respect to the distribution of ovules, pods with an odd number must be bilaterally asymmetrical; those with an even number are generally bilaterally symmetrical.

The results which led up to the present study were the discovery of an intra-individual selective elimination of ovaries with a larger number of "odd" locules in *Staphylea*[1] and the demonstration of a usually lower fertility and fecundity in "odd" pods of *Phaseolus*.[2]

[1] For literature, see: "The Selective Elimination of Organs," Science, N. S., XXXII., 519–528, 1910; "On the Selective Elimination occurring during the Development of the Fruit of *Staphylea*," *Biometrika*, VII., 452–504, 1910; "Further Observations on the Selective Elimination of Organs in *Staphylea*," *Zeitschrift f. Ind. Abst.- u. Vererbungsl.*, V., 273–288, 1911; "The Measurement of Natural Selection," *Pop. Sci. Mo.*, LXXVIII., 521–538, 1911.

[2] "On the Relationship between Bilateral Asymmetry and Fertility and Fecundity." In press in Roux's *Archiv f. Entwickelungsmechanik*.

Among the series of individually weighed bean seeds gathered for a study of the pure line problem are five in which the number of ovules in the pod from which the seed was taken is recorded. These series (designated by key letters) are:

L. Golden Wax. Grown at Lawrence, Kansas, 1906. 2,861 seeds.

LL. Golden Wax. Plants the offspring of the L series, grown at Lawrence, Kansas, 1907. 3,947 seeds.

GG. Burpee's Stringless. Grown at the Missouri Botanical Garden, 1907. 8,364 seeds.

H. Navy. Grown near Sharpsburg, Ohio, 1907. 5,778 seeds.

D. Navy. Another series, grown under very different conditions near Sharpsburg, Ohio, 1907. 2,362 seeds.

The material is, therefore, rather extensive and diversified. Two methods of analysis are possible. (*a*) The pods may be merely classified as "odd" and "even" and the mean weight of the seeds produced by each kind determined. (*b*) A regression equation can be fitted to the whole data and the weighted mean deviation of the empirical means from the theoretical means determined for either "odd" or "even" pods.

Let o = number of ovules per pod, w = weight of seed in units of .025 grams. Then correlations and regression straight line equations are:[3]

Series	Correlation	Regression Equation
L	$r = -.0401$	$w = 16.4645 - .1597\ o$
LL	$r = +.0586$	$w = 13.0281 + .2060\ o$
GG	$r = +.0109$	$w = 17.3881 + .0354\ o$
NH	$r = -.1410$	$w = 11.0961 - .2806\ o$
ND	$r = -.1227$	$w = 8.5554 - .2583\ o$

The correlations are in all cases low. Testing the influence of the "odd" (asymmetrical) character of the pod upon the weight of the seed by the weighted mean deviation (regarding signs) of the average weights of seeds produced by odd pods from the theoretical means calculated from these equations as well

[3] Data from which all the constants given here may be checked will be eventually published for another purpose.

as by the method of comparison of averages for all "odd" and "even" we find:

Series	Regression Line Test	Difference in Means
L	—.0137	—.0030
LL	—.0768	—.2506
GG	—.0164	—.0329
NH	—.0597	—.0338
ND	—.0777	—.1754
Unweighted averages	—.0489	—.0991

By both methods all the deviations are negative in sign, though of a low order of magnitude. Apparently, bean seeds produced in pods with an odd number of ovules are about .0025 gram lighter than those in pods with an even number. Asymmetrical pods are, therefore, physiologically less efficient than symmetrical. To be sure the relationship is a very delicate one; the individual series show considerable fluctuations. Many more observations are desirable, but the duplication of a series of over 23,000 individual weighings with records of the characteristics of the pods from which the seed was derived is not easily carried out. The findings are consistent throughout within the limits of error. They confirm from an entirely different angle conclusions drawn from studies of selective elimination and of fertility and fecundity. It seems worth while, therefore, to place on record the results for the available data.

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HEAT CONDUCTIVITY OF CRYSTALS

FOR several years one of the experiments in our course in physical crystallography has been a qualitative determination of the conductivity of heat in crystals by the Senarmont method described by Groth, "Physikalische Krystallographie," page 178. The Senarmont apparatus is used for these tests. It consists of a stage for supporting the crystal, so arranged that a spring presses it up against the contact point of the conductor. The latter is bent at right angles and may be heated at the other end by a flame. Results were quite unsatisfactory because when the point, resting on the paraffined surface of the crystal, became heated it radiated sufficient heat to melt the paraffine and the figure, which might have been obtained by heat conducted through the crystal, was destroyed. Since the heat was radiated equally in all directions a circle in the paraffine resulted. A modification of this method gives much better results.

A plate of the mineral, for example, gypsum, about 1–2 mm. thick is dipped in melted paraffine until a thin even coat is formed on one side. The plate is then placed on the stage of the instrument with the paraffined surface down, but is insulated from the stage by strips of asbestos under the edges. The point of the conducting wire rests in a depression in the upper unparaffined surface. In this way, when the heat is conducted along the wire to the crystal it must actually be transmitted through the gypsum before it can melt the paraffine. A very sharply defined ellipse will be noted in the paraffine and this is clearly due to differences in conductivity of the gypsum in different directions and not to radiation from the wire.

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SOME CURIOUS CASES OF SELECTIVE REFLECTION IN ULTRAVIOLET LIGHT

PROFESSOR WOODS, of Johns Hopkins University, has found that some white flowers, when photographed in ultraviolet light, appeared as black or nearly so. This fact led the writer to examine the behavior, in such circumstances, of a number of alkaloids, glucosids and other vegetable immediate principles he happened to have on hand. The result is shown on the two accompanying figures. Photograph number I. was taken with an ordinary objective. Number II. is a photograph of the very same substances taken with a quartz convex meniscus, silvered on both faces and completely opaque to visible light. The 24 substances had been previously powdered and somewhat compressed into their respective boxes. As the ordinary photograph shows, they were, with but one exception (berberin) perfectly white. Photograph number II. shows that, if our eye were sensitive