

Letters to the Editor.

The Colouring Matter of the Seed-Coat of
Abrus precatorius, Linn. (Scarlet Variety).

THE first attempt towards the isolation of the colouring matter of *Abrus* seeds was made by Sarkar (*Biochem. J.*, **8**, 281-86, 1911) who extracted two colouring matters, yellow and scarlet, by soaking the crushed seed-coat in water and finally separating them with ether. He purified the scarlet colouring matter by preparing the insoluble copper salt and from a study of some colour reactions concluded it to be a tannin substance. The next reference that "anthocyanin is sometimes developed in the cells of the testa of seeds of *Abrus*" is recorded in Onslow's book (*The Anthocyanin Pigments of Plants*, 1925, p. 30).

The present author has, however, been able to isolate an anthocyanin and gallic acid from the seed-coat. The presence of gallic acid probably confused Sarkar to come to the premature conclusion that the colouring matter of *Abrus precatorius* was a tannin substance. The anthocyanin has been named *abranin*.

Hot aqueous extract of the crushed seed-coat is precipitated with excess of lead acetate. The lead salt is macerated with glacial acetic acid in the cold and the filtrate which is of a pink red colour is precipitated with ether till the pink colour of the solution just disappears. The colouring matter is obtained by decomposing the precipitated blue lead salt in ethyl alcohol (98%) suspension with hydrochloric acid and finally precipitating the filtrate with ether. The crude *abranin* chloride thus obtained on purification in the usual way and on remaining over calcium chloride in a vacuum desiccator melts at 178-79° with previous sintering. Gallic acid is obtained by decomposing the lead salt that is recovered on concentrating the acetic acid filtrate.

Abranin chloride isomerises readily in neutral solvents like water, methyl and ethyl alcohols, etc. Its colour reactions have been studied. The sugar of hydrolysis of *abranin* chloride has been identified to be glucose. *Abranin* picrate, prepared in the usual way, has been obtained in the form of chocolate-red plates and melts at 149-50°. Determination of the distribution number of the substance confirms it to be a monoglucoside. The absorption

spectra of the colouring matter in methyl alcohol-hydrochloric acid have been studied.

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December 10, 1933.

Bacteria in relation to Soil Fertility and
Crop Yield.

"A PROBABLE correlation between soil fertility, crop yield and the number of Microflora has been suggested by various workers. The writer while working at Rothamsted on Hoos-field (Permanent Barley) plots was able to show that a correlation existed between soil fertility, crop growth and the number of Bacteria in the soil. Since his return to India he has been engaged in making Microbiological investigations in connection with the reclamation of Alkali soils. The reclamation work is being carried on barren lands in the Punjab and these cover a good deal of area in the Province. Soils were brought from the experimental fields with a soil borer from surface soil 0"-6". About half a dozen plantings were done. The medium used was Thornton's Mannite Agar. The following dilutions were made:—

1. 25 grams of soil in 250 c.c. of water 1/25.
2. 1 c.c. of (1) in 100 c.c. of water 1/250.
3. 1 c.c. of (2) in 100 c.c. of water 1/250000.

Total number of colonies were counted after a week's incubation and the average taken from the five plates examined for each plot. The yield of rice crop is taken as an indication of the state of reclamation and the stages of reclamation which are recognised at the Chakkianwali Reclamation Farm (Punjab) are as follows:—

(a) If the yield of rice crop is 12 maunds or below, the land is only partially reclaimed.

(b) If the yield of rice crop is between 12 to 20 maunds per acre this indicates an advance of reclamation over (a).

(c) If the rice crop is 20 maunds per acre or over then the land is considered to be fully reclaimed.

With a view of obtaining comparison which would indicate the stage of reclamation reached the writer has been engaged in carrying on work on the quantitative aspects of Bacterial numbers in the different types

of soils produced during the process of reclamation.

These replicated studies have shown that quantitatively the number of Bacteria is different in various plots reclaimed and it is of great interest to note that there seems to be a definite correlation between soil fertility as indicated by the crop growth and the number of Bacteria. Thus different plots of reclaimed soils, namely, those which give a yield of (i) over 20 maunds, (ii) between 12 to 20 maunds, (iii) below 12 maunds show Bacterial numbers of the magnitude of 19,750,000; 14,250,000; 8,250,000; and 5,250,000 per gram of dry soil respectively.

A similar correlation has recently been established by Dr. A. N. Puri [*Punjab Irrigation Research Laboratory Memoirs (in press)*] between the degree of alkalisiation or saline contents and the crop yield, the greater the saline contents, the lesser the yield and *vice versa*.

These observations seem to indicate that during the process of reclamation of Alkali soils different plots giving different Rice yields have Bacterial population also different, the number of Bacteria having a correlation with the crop yield."

JAGJIWAN SINGH AHLUWALIA.

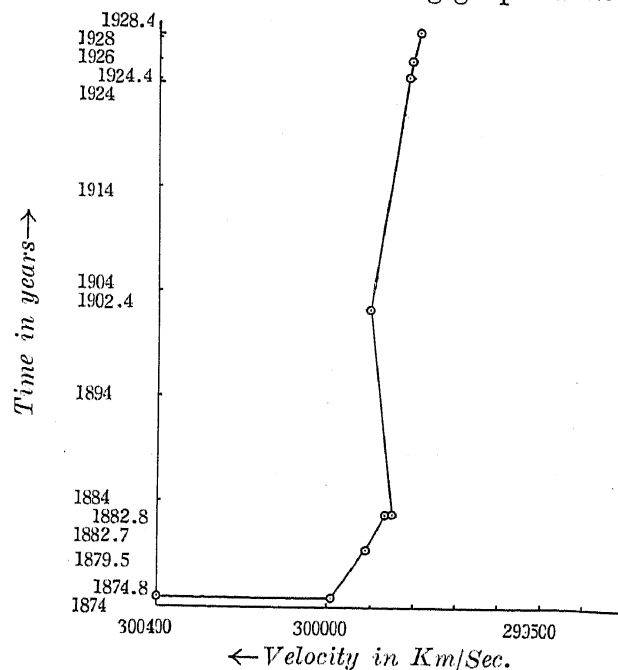
Botanical Laboratories,
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December 15, 1933.

The Velocity of Light.

DR. ALARABY in a brief note on the decrement of the velocity of light¹ mentioning De Bray's article² gives us to understand that the details would be published in the *Ind. J. Phys.* and the *Phys. Rev.* Hence it would be premature on our part to question his conclusions, yet we have no hesitation to contend that so far we are not in possession of even a single definite experimental evidence to point out the decrement in the actual velocity of light. So any mathematical account calculated on the basis of the results up till now obtained certainly would prove erroneous. All the experimental results of the velocity of light so far quoted and derived only go to show that each experiment has led to obtain higher accuracy in

the result and we are yet to determine the value of the 'constant'. Michelson himself after declaring his result³ obtained in 1924 mentioned that in the succeeding year he would be able to 'furnish results four or five times more accurate'.

In *Nature* of Oct. 22, 1927, p. 602, De Bray has provided a table of experimental values of the velocity of light, indicating seven trustworthy determinations. Plotting the results we obtain the following graph which



is something of a sort of a sine curve and not merely a straight line inclined to the axis of time as mentioned in *Nature* of April 4, 1931, p. 522. De Bray secures a straight line in the graph as he only considers the results obtained after the year 1902. We maintain that if the curve fails to tend asymptotically it is because we have not as yet reached the value of the 'constant'.

Admitting for a moment the determinations as indicating the decrement how is it that the velocity of light *invariably* decreases in an 'excellent linear law of variation' in spite of the earth's magnetic field of varying intensity.

Even the General Theory of Relativity is not definite on this issue.

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C. M. BHASKER RAO.

Aligarh,
February 6, 1934.

¹ *Curr. Sci.*, 2, 244, 1934.

² *Nature*, April 4, 1931.

³ *Nature*, Dec. 6, 1924, p. 831.