

as a distinct advance on any of the results so far obtained.

In addition to the acids, the products of fermentation include other forms of organic matter, as also considerable quantities of mineral salts (chiefly iron, aluminium and manganese), in solution. Further work is in progress to determine as to how far these constituents (collectively or individually) contribute to the fixation. Attempts are also being made to prepare the mixed products in solid form and to standardise the conditions for their application in field practice.

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¹ Bhaskaran, T. R., and Subrahmanyam, V., *Curr. Sci.*, 1935, 4, 234; *Proc. Ind. Acad. Sci.*, 1936, 3B, 143.

² Bhaskaran, T. R., *Proc. Ind. Acad. Sci.*, 1936, 3B, 320.

The Electrical Resistance of Wood and its Variation with Moisture Content.

THE electrical resistance of wood has been the subject of study by a number of investigators. Hasselblatt¹ and Stamm² noticed a linear relationship between the logarithm of the electrical resistance of wood and the moisture content below the "fibre saturation point". On the other hand, Suits and Dunlap³ found that the degree of linearity is not so great as that observed by Hasselblatt and Stamm. The same is suggested by the experiments of Gaitzsch.⁴ Stamm comes to the conclusion that the electrical resistance does not show any appreciable variation with species and density and that the steep logarithmic relationship established permits considerable variation in the resistance without largely affecting the calculated moisture content. Based on these findings a number of electrical moisture meters have been put on the market in Europe and America for the determination of the moisture content of wood between 7 and 24%.

Recently, in response to an enquiry the author had to design a cheap and reliable moisture meter suitable for this country. While the data mentioned above relate to American and European woods no data

are available for Indian woods. In view of this fact and as the electrical resistance of wood has not been studied exhaustively under a variety of conditions a detailed investigation of the electrical resistance of Indian woods has been taken up by the author. In Fig. 1, some of the preliminary results obtained by the author are shown,

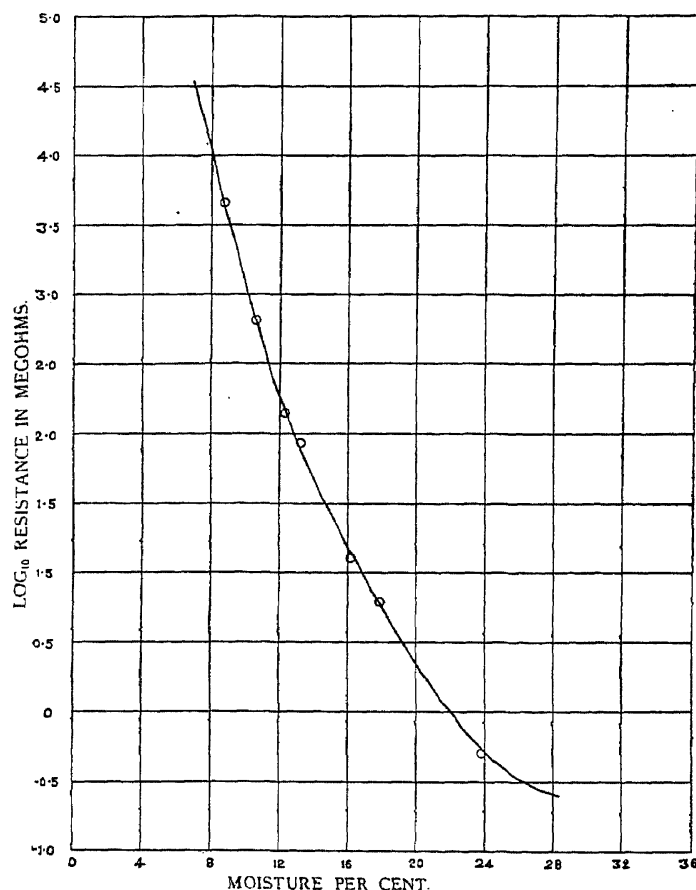


Fig. 1.

the logarithm of the resistance being plotted against the moisture content. They relate to small specimens of *Canarium euphyllum* (white dhup) which had been carefully conditioned in air-conditioning chambers⁵ and hence were practically free from moisture gradients. The density of the pieces (based on oven-dry weight and oven-dry volume) varied from 0.333 to 0.484 gm./cm³. The results were obtained with a special type of knife-shaped needle contacts (which penetrate better into the Indian hard wood than the usual round ones) $\frac{3}{4}$ inch apart and a suitably designed thermionic vacuum tube amplifier. These results show that the degree of linearity is probably not so great as that observed by Stamm and the curve is more similar to that obtained by Suits and Dunlap. In Fig. 2, the same results are plotted on a logarithmic scale. The results of Suits and Dunlap have also

been plotted for the sake of comparison. While Fig. 2 suggests that there is an approximately linear relationship between the logarithm of the resistance and the logarithm of the moisture content it is

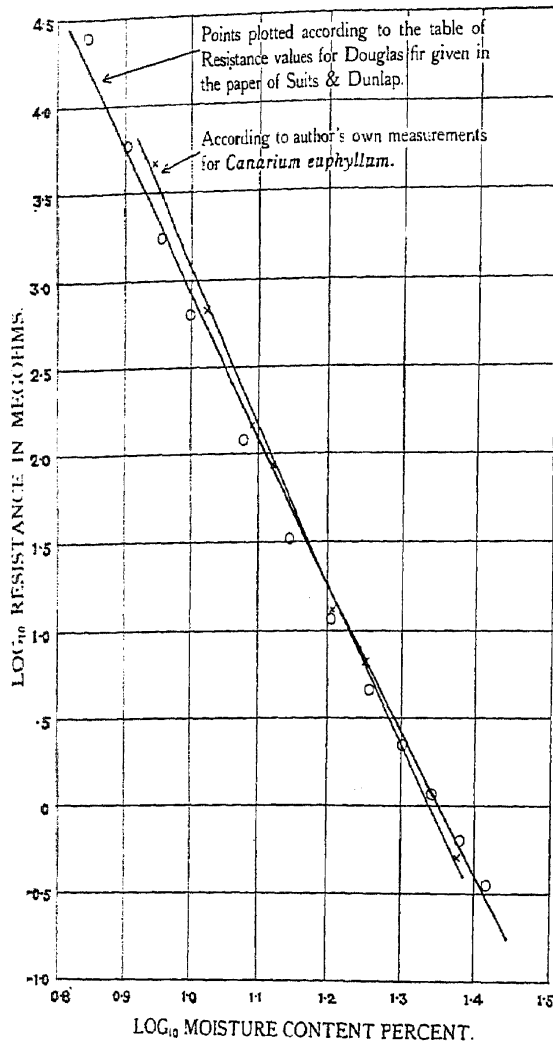


Fig. 2.

proposed to extend the study to specimens from different localities and of different density, species, etc. before arriving at any definite generalisations. In these preliminary trials it was also noticed that not inconsiderable variations exist in the electrical resistance of different species. For instance, *Bombax malabaricum* (semul) was found to have a considerably lower resistance while some woods showed a rather high value. The effect of species, density, temperature, steaming, removal of inorganic impurities, resin content, presence of drying or absorbing gradients, etc., will be studied.

A few vacuum tube circuits, including one employing a ballistic galvanometer have been studied and found satisfactory. Based on the results obtained so far, a moisture

meter has been constructed which will shortly be tried in the wood-working industry. A detailed account of the work will be published in due course.

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- ¹ *Z. anorg. und. allge. Chem.*, 1926, **154**, 375.
- ² *J. Ind. Eng. Chem.*, 1927, **19**, 1021.
- ³ *Gen. Elec. Rev.*, 1931, 706-713.
- ⁴ *Forschungsberichte Holz* Heft 3, 6.
- ⁵ *Vide This Journal*, 1934, **2**, 483.

A Clay Seal and a Sealing of the Śunga Period from the Khokra Kot Mound. (Rohtak).

AMONG the further material I collected on May 10, 1936, at Rohtak¹ was a well-preserved clay seal of square shape (Fig. 1) and a round sealing in Brāhmī characters (Fig. 5). As my full account of the antiquities from Rohtak is likely to be delayed in publication I propose to give here a brief description of these interesting specimens. Both the originals have been examined by Mr. K. P. Jayaswal who has kindly sent me notes on them.

1. The square seal, shown natural size in Fig. 1, may be disposed of at once. It bears three parallel lines in negative relief. The lines are in the form of a deep arc; they seem to have been made in one stroke, with a three-pronged instrument which was pushed obliquely into the soft clay at the commencement of the process. The significance of the sign is not clear. Mr. Jayaswal suggests that there was probably a *ga* (ग) in the middle of the arc, but I am unable to find a trace of any lines apart from the three seen in the photograph. Possibly they represent three *ga*'s, inside one another, but the positive (Fig. 2) seems to discredit this view. The seal was a surface find, from the hillock in the NE part of the mound, where there is a recently built shelter and a number of recent Hindu monuments to the