

foil as described by Darbyshire and secondly by following the method of Sebatier and Senderens which consists in heating the metallic foil in an atmosphere of nitric oxide to a temperature of about 250°C. A very fine film of copper oxide was formed on the metallic surface, in both the cases. These films are supposed to consist of Cu_2O only and no CuO is supposed to be formed. The films so prepared were removed from the surface of copper by the method employed by U. R. Evans⁵ and on investigation were found curiously enough to be definitely paramagnetic, as against the Cu_2O in bulk which we showed definitely to be diamagnetic. There are only two explanations of this behaviour. Firstly, that the film is contaminated with a paramagnetic material, possibly the CuO and secondly, that the magnetic properties of the Cu_2O in film are different from those of the substance in bulk. The second view is not possible on account of the fact that Cu_2O was prepared by different methods and consisted of all sizes of particles: The values of χ however in all the cases of different sizes of particles were nearly always equal to -0.188×10^{-6} both in our experiments and in those of Klemm and Schüth. Also in view of the recent work of Lane⁶ that the particle size of the film of bismuth has no effect on its susceptibility and that the films examined are paramagnetic, it looks likely that the impurity responsible for the paramagnetism of these films is the production of a trace of the paramagnetic CuO . Further support in favour of this view comes from a recent entirely different investigation of G. Athanasiu,⁷ who, in course of his investigations on the spectral sensitivity of photo-voltaic piles of copper electrodes coated with Cu_2O , has shown that the presence of a trace of CuO in the sub-oxide tends to diminish the E.M.F. produced by light and also displaces the maximum of sensitivity towards the red end of the spectrum. He coated the plates of copper with thin films of Cu_2O by three different methods and the effects obtained by him are in some cases positive and in others negative, depending on the presence or absence of CuO , as a contamination in the Cu_2O films. According to this author, the films prepared by heating copper in electric furnace contain a good amount of CuO . When these black

scales of CuO are removed the positive effect noted above on the photo-galvanic effect of Cu_2O is totally suppressed.

From the magneto-chemical data and the work of Athanasiu it appears probable that the Cu_2O films prepared in the manner described in this paper, contrary to the evidence obtained by Bragg and Darbyshire, consist of a mixture of both Cu_2O and CuO . A fuller account of the work will be presented elsewhere.

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The Presence of Scattered Vascular Bundles in the Stem of *Elatostema sessile*.

In the vast majority of the Dicotyledons the vascular bundles of the stem are arranged in a ring; hence an observation to the contrary is naturally of interest.

Material of *Elatostema sessile*, a member of the family Urticaceæ, was collected from Mussourie and pieces of stems of various ages were sectioned. It was found that in the greater part of the stem the bundles are irregularly scattered, the larger ones being towards the outside and the smaller towards the centre (Fig. 1). Fig. 2 shows one of

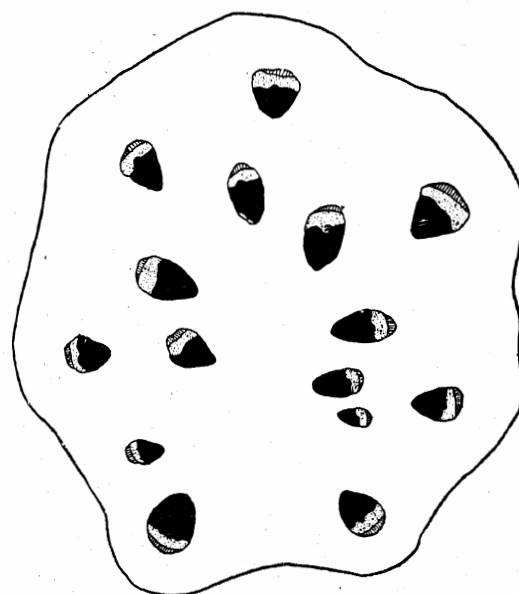


Fig. 1.

these bundles at a higher magnification. It is only at the base of the stem that the bundles are arranged in ring and there is a continuous cambium cylinder with normal

⁵ U. R. Evans. *Jour. Chem. Soc.*, 2651, 1929.

⁶ C. T. Lane. *Nature*, December 31st, 1932.

⁷ G. Athanasiu. *Comptes Rendus*, 195, 767, 1932.

secondary growth. An almost similar condition is known to exist in *Podophyllum peltatum*.

So far as I know, such a behaviour has not been recorded before in the family Urticaceæ. A detailed investigation is in progress and the results will be published elsewhere.

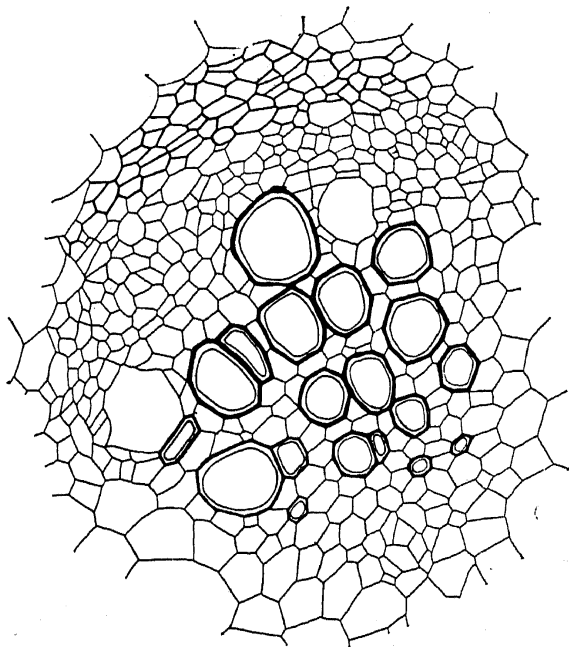


Fig. 2.

The figures were drawn at my request by one of my students Mr. Bahadur Singh, M.Sc.

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The Raman Effect of Fused Inorganic Nitrates.

THE Raman Effect of inorganic nitrates in solution and as powdered crystals has been studied by a number of investigators and the normal vibration frequencies of the NO_3 ion, theoretically calculable from a plane equilateral triangular model, are known to be present in the scattered spectrum of these compounds. It is also well known that these free ionic frequencies are modified to a certain extent by the physical state in which the substance is studied. For example, in crystals these frequencies have higher values than in solutions. It will be interesting to study how far the fused state of the substance affects these natural frequencies. With this purpose in view we

have investigated a number of inorganic nitrates (whose melting points are below 600°C) in which the Raman spectra are obtained with the substance maintained in a molten condition in a specially constructed electrical furnace. The full report of the investigation is in course of publication and we give below the results obtained with sodium and potassium nitrates only.

	Solution	Crystal	Fused salt
NaNO_3	725	720	715
	1048	1066	1054
	1361	1383	1393
KNO_3	730	711	721
	1049	1051	1052
	1357	1350	1343

In sodium nitrate so far as the inactive frequency at 9.5μ is concerned the fused state occupies an intermediate position between the crystal and the solution while in potassium nitrate this oscillation is apparently uninfluenced by the physical state. This independence of the inactive frequency upon the physical state becomes more and more apparent as the weight of the metallic radical increases. Thus the greatest discrepancy is shown only in lithium and in sodium. With regard to the active frequencies there does not seem to be any systematic variation. The very short shifts observed in crystals and associated with the lattice structure are not obtained in the fused salts.

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Boring Apparatus in Balantidium.

SINCE Ray¹ pointed out the presence of a boring mechanism in *Balantidium sushilii* from *Rana tigrina* Daud, I have examined several other species of *Balantidium* from the same host and *Bufo melanostictus* Schneid, available in Calcutta. From the accompanying camera lucida drawings of

¹ Ray, 1932. "On the Morphology of *Balantidium sushilii* n.sp., from *Rana tigrina* Daud." *Jour. Roy. Micros. Soc.*, **52**, 374-382.