

The acid thus obtained had all the properties of ψ -opianic acid obtained by Perkin. For confirmation of its identity it was reduced to ψ -meconine m.p. 124, and also converted into its oxime, m.p. 124 and hemipinimide. The mixed melting point of these derivatives with the corresponding authentic specimens caused no depression.

The oxidation of several other homophthalic acids to the corresponding phthalonic acids by means of Selenium dioxide has also been studied. In every case an excellent yield of the phthalonic acid is obtained. Homophthalic acids being readily available substances, this new method of synthesis should prove to be a valuable one.

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Changes in the Charge on Colloidal Particles during Dialysis of Sols.

IN papers* published from our laboratory we have put forward the view, on the basis of experimental evidence, that a colloidal solution when subjected to dialysis will show first an increase and then a decrease or a continuous decrease in the cataphoretic speed according as the amount of the peptising electrolyte initially present is more, or equal to or less than the amount corresponding to the maximum in the cataphoretic speed-concentration curve of that sol with the particular (peptising) electrolyte. Colloidal solutions of gold, ferric hydroxide and thorium hydroxide have been found to conform to this behaviour. S. G. Chaudhury† has also observed in the case of colloidal solution of copper ferrocyanide containing very high concentrations of potassium ferrocyanide that with the progress of dialysis the cataphoretic speed first increases and reaches a maximum after which it decreases.

We have been investigating other colloidal solutions from the point of view stated above and have observed that the prussian blue sol (peptised with oxalic acid solution) when subjected to dialysis shows a behaviour similar to the colloidal solutions of gold, ferric hydroxide, thorium hydroxide and

copper ferrocyanide. In the case of arsenious sulphide, however, on subjecting the sol to dialysis, the cataphoretic speed first decreases and reaches a minimum, then increases and reaches a maximum and afterwards again decreases. The sol was so prepared that it did not contain initially any free arsenious acid. The dialysis was carried out in a dark place to avoid effect of light on the sol. On analysing the various samples of the sol used in cataphoretic speed determinations, it was found that the amount of arsenious acid increased with the progress of dialysis till the cataphoretic speed decreased; after the minimum value of cataphoretic speed was reached the amount of arsenious acid began to decrease, apparently due to further hydrolysis stopping and arsenious acid passing out in the dialysate. S. N. Mukherjee‡ has observed that the cataphoretic speed of arsenious sulphide decreases on the addition of arsenious oxide to the sol. The initial decrease in the cataphoretic speed with an increase in the amount of arsenious acid due to hydrolysis of the sol noticed by us therefore agrees with the observations of S. N. Mukherjee. The subsequent increase in the cataphoretic speed may be due to a decrease in the amount of arsenious acid as well as the peptising sulphid-ions and hydrosulphid-ions and the final decrease due to a considerable decrease in the amount of the peptising ions. Detailed results will be published elsewhere in due course.

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Development of Vertebral Column in Fishes.

PROF. MACBRIDE¹ reviewing my work² on the "Development of the Vertebral Column in Fish" expressed a doubt as to the correctness of my view in regard to the origin of the zygapophyses in the fish. He wrote: "Ramanujam describes these (the zygapophyses) as vertical outgrowths of the 'outer

‡ S. N. Mukherjee, *Kolloid Z.*, **53**, 159, 1930.

¹ MacBride, E. W., "Recent Work on the Development of the Vertebral Column," *Biological Reviews*, Cambridge, **VII**, 1932, pp. 108-148.

² Ramanujam, S. G. M., "The Study of the Development of the Vertebral Column in Teleosts, etc.," *Proc. Zool. Soc.*, 1929, pp. 365-414.

* Desai, Nabar and Barve, *J. Ind. Chem. Soc.*, **9**, 463, 1932; Desai and Borkar, *Trans. Faraday Soc.*, **29**, 1269, 1933; and B. N. Desai and A. K. Desai, *ibid.*, **30**, 265, 1934.

† S. G. Chaudhury, *J. Ind. Chem. Soc.*, **10**, 431, 1933.