difference in the colours of the shadows was not so pronounced, and with the light film it was less still.

The same observer then made ten settings with the opaque strip, ten settings with the dark film, and ten settings with the light film. The mean position of the green lamp was found to be at 162·2 cm., 169·9 cm., and 171·1 cm. in the three cases, the probable errors of the means being 3·5, 1·6 and 2·9 cm. respectively. Thus the dark film gave the most accurate and the opaque strip the least accurate results. It is obvious that for each pair of lights there must be a most favourable density for the film, for if it were perfectly transparent, there would be no shadows.

It would be interesting to compare the accuracy of this method with that of the step-by-step method, but the comparison should be made by someone practised in the routine of the latter method.

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## Preparation of Colloidal Metals

IN the course of an investigation of the properties of thin dielectrics at high field strengths, an interesting phenomenon has been observed, involving the passage of substances through the dielectric, and leading to a method for the preparation of colloidal suspensions of liquid metals and alloys in semi-conducting media.

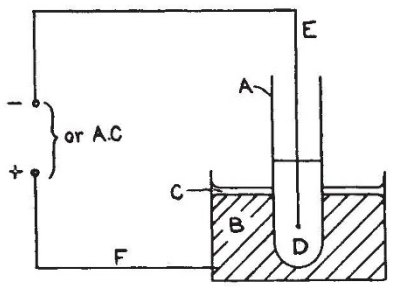


FIG. 1. Diagram of apparatus for preparation of colloidal metals: *A*, cellulose acetate cup; *B*, mercury bath; *C* and *D*, tricresylphosphate; *E* and *F*, metallic electrodes.

Referring to the diagram, if a cup-shaped semi-permeable membrane (for example, 0·1 mm. thick), prepared from cellulose acetate and containing a semi-conducting liquid such as tricresylphosphate, is immersed in a bath of mercury, then an electric field of the order of 40 kv./mm. applied between the mercury and the tricresylphosphate will cause a copious flow of mercury through the cellulose acetate, the mercury remaining colloidally dispersed in the tricresylphosphate. Either alternating or continuous voltages may be used, but in the latter case the polarity must be as shown. The mercury is covered with a thin layer of the semi-conducting medium, which serves to wet the surface of the cup as the latter is lowered into the mercury. The suspensions made by this means have remained stable for considerable periods.

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## Influence of an Electric Field on the Thermal Conductivity of a Solid

A SUBSTANCE with a permanent electric moment, such as bees-wax, was allowed to solidify in an electric field. Afterwards it showed permanent greater thermal conductivity in the direction of the field, which had been applied before solidification occurred, than when it solidified without an electric field. When an alternating field (50 cycles) was applied during the solidification, no alteration of thermal conductivity was noticed.

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## Cryolysis, Diffusion and Size of Particles

PROCEEDING from earlier considerations[1], the view was put forward recently that under the effect of freezing[2], particles of aqueous solutions of lyophilic biocolloids will undergo disaggregation or aggregation according to the prevailing concentration of the particles.

To test the validity of this conclusion, further experiments were carried out with the object of determining the speed of diffusion of frozen (at −17° and −79° C.) and unfrozen solutions of sodium oleate, ovalbumin and polyacrylic acid. Under our experimental conditions and with these substances, it could be shown that the effect of freezing causes in solutions of concentrations up to 1 per cent a disaggregation which could be measured by an increased speed of diffusion, and in solutions of concentrations higher than 1·5 per cent an aggregation manifesting itself by a decreased speed of diffusion in comparison with that of the unfrozen solutions. There was only one exception observed. This occurred in experiments carried out with freshly prepared solutions of polyacrylic acid, due to the fact that this substrate swells before it undergoes solution. The more the concentration is diminished, the more the disaggregation prevails; and the more the concentration is increased, the more we can observe an aggregation which may lead up to a coagulation.

These observations may afford further support to explanations given elsewhere for the transient increase in activity of frozen solutions of zymases, peroxidases and tyrosinase in connexion with the carrier theory[3] of enzymatic activity, may also explain the well-known effect of increased fertility of soil after a severe winter period, and may also have some bearing on the explanation of the behaviour of certain lyophobic colloids during the freezing of muscle plasma.

Details of these experiments will be published shortly elsewhere.

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[1] F. F. Nord, NATURE, **120**, 82; 1927. *Trans. Faraday Soc.*, **26**, 760; 1930.
[2] F. F. Nord, *Science*, **75**, 54; 1932.
[3] A. P. Mathews and T. H. Glenn, *J. Biol. Chem.*, **9**, 51; 1911.