validity. The problem requires working out to a higher approximation before the results can be applied to scattering by the heavier nuclei.

It should be mentioned that the experimental result of 1·74 per cent is more likely to be low than high. The foils used were highly inhomogeneous, and multiple scattering, which is not expected to contribute to the polarisation, from the thicker parts is certainly present, but to an unknown degree.

It is hoped to publish a fuller account of the experiments in the near future.

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[1] Mott, *Proc. Roy. Soc.*, A **124**, p. 425; 1929.
[2] Chase, *Phys. Rev.*, **36**, p. 1060; 1930.
[3] Langstroth, NATURE, **127**, p. 891; 1931.
[4] Rupp, *Naturwiss.*, **19**, p. 109; 1931. Rupp and Szilard, *ibid.*, p. 423.

## A Curious Phenomenon shown by Highly Charged Aerosols.

IN the course of investigations on the electrification of aerosols, a curious phenomenon was noticed. The aerosols were volatilised in a glass chamber of about four cubic metres capacity. During the dispersal a unipolar discharge was produced by connecting one pole of a large electrostatic machine to a metal brush inside the chamber. The contents of the chamber were agitated by an electric fan during dispersal and for a minute or so afterwards.

Whenever this type of aerosol is produced in our chamber, a striking phenomenon makes its appearance. Directly the fan has stopped, large particles begin to arrive in the centre of the chamber, and these gradually draw together to form a large, loose, more or less spherical cluster about 20 centimetres in diameter, the particles, however, retaining their individuality. The particles composing the sphere appear to be highly electrified, since, if a charged wire is pushed towards it, the sphere as a whole is rapidly attracted and absorbed when the wire is of one sign and repelled by the other. In this way the sphere may be pushed right across the chamber, though it may be distorted in the process. If now the wire is removed, the sphere tends to return again to the centre.

The greater number of particles when examined by the electric cell, which we have previously described,[1] are seen to be very highly charged to the same sign as the brush discharge. The particles composing the sphere, on the other hand, are highly charged to the opposite sign. Thus if the aerosol is charged positively by a positive brush discharge, the sphere is made up of negatively charged particles and vice versa. The phenomenon is exhibited by all aerosols which we have examined, but is especially striking in the case of a dyestuff such as *p*-xylene-azo-*β*-naphthol. An aerosol of this material when dispersed at a concentration of about 15 mgm. per cubic metre is greenish blue in a Tyndall beam, and after electrification retains this colour. The sphere which forms in the centre of the chamber, however, is bright red, this being the colour of large particles of the material.

By inserting a cover-glass into the cluster, it was found possible to collect some of the particles, and microscopic examination showed that they consisted of long chains or ropes of particles containing apparently thousands of units.

The phenomenon may probably be explained as follows. Suppose we consider an aerosol which has been positively charged by a positive brush discharge. The outside of the glass walls of the chamber immediately after dispersal is found to be highly positively charged. This implies that the inside is negatively charged by induction, though we have not been able to verify this experimentally. If then complexes carrying a high negative charge are present in the chamber, they will certainly be repelled towards the centre. On reaching the centre, their mutual repulsion will prevent very close approach, so that a loose sphere should be formed.

The complexes themselves may be formed in the following way. Whilst, for example, the positive brush discharge is in action, heavy negative charges must be induced on any objects near the brush. Now experimentally we find that if there are two point electrodes with a field of a few hundred volts per cm. between them in an aerosol, long chains of particles will gradually form and project out from the points. These chains may easily be detached by an air current, and will presumably remain as long chains, providing that the cohesive force between the particles is greater than the repulsive force due to their charge. A similar state of affairs will probably obtain whilst the brush discharge is in action. When the fanning ceases, the negatively charged chains will obviously be repelled to the centre of the chamber, whilst those positively charged will be attracted to the walls.

It may be noted that if the sphere is once completely removed in any way, it will not reform, and that in any case it tends to disperse with lapse of time. This latter may be attributed partly to gradual neutralisation of the charges on the complexes by coagulation with particles of opposite sign and partly to loss by leak of the charge induced on the glass walls.

The existence of such a spherical, highly charged assemblage of particles suggests that globular lightning may owe its origin to an analogous effect, in which particulate matter, either liquid or solid, is charged to a very much higher potential.

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June 12.

[1] *Proc. Roy. Soc.*, A, vol. 124, p. 523; 1929.

## Temperature Stability and Denaturation of Serum Albumin.

IT has been shown by Svedberg and Sjögren[1] that at ordinary temperature serum albumin is stable (that is, homogeneous with regard to molecular weight) in a region of *p*H varying between 4 and 9. These authors have also shown that outside of the stability region, but not too far from it, the serum albumin molecule is dissociated into smaller molecules. This first stage of breaking up of the molecule probably means the formation of particles of half the weight of the original molecule. The complete breaking up of the molecule follows immediately after this stage. The first stage has been shown to be reversible with regard to the molecular weight.

Now the influence of different heat treatment on serum albumin in different buffered solutions has been studied by means of the ultracentrifugal technique worked out by Svedberg and the electrophoretic technique worked out by Tiselius,[2] and it was found that there is a distinct difference in the behaviour of the serum albumin inside and outside the stability region. Inside the stability region, different proportions of the total quantity of the serum albumin will undergo change and give aggregation products, the number and size of these aggregation products varying according to the *p*H and to the salts of the solution, to the temperature and the time during which the heat treatment has taken place. That part of the serum albumin which has undergone aggregation may, if not already coagulated, be removed by centrifuging, and