the surrounding sky. This arc appeared to have its centre at the sun, and was separated from the halo of 22° by an angular distance of about 3°. Its position with respect to the halo of 22° did not appear to change with time, although the intensity of the light from it decreased more quickly then than that from other parts of the halo. The arc *d* was not noticed

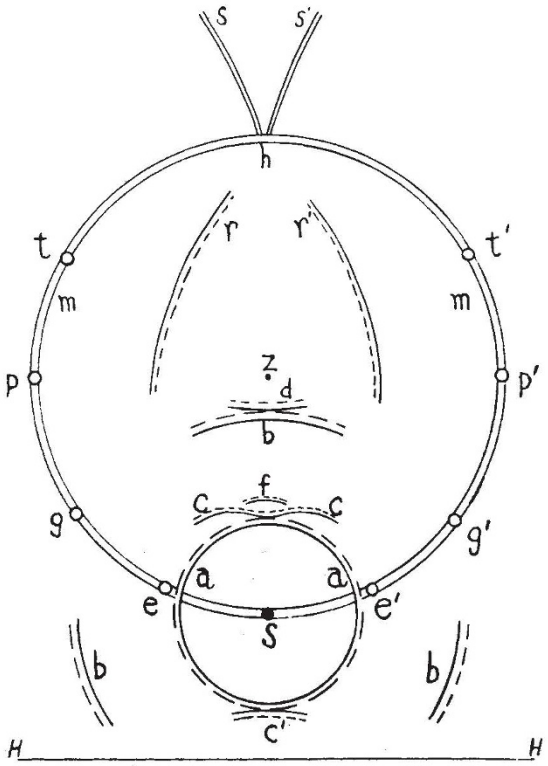

FIG. 1.

until several minutes before the disappearance of the halo, when it appeared as a short, brightly coloured arc, curved towards the zenith.

Although halos are an infrequent occurrence in western Canada, halos of varying degrees of complexity were seen almost daily during the second and third weeks of April. During this period of time there were two large dust storms, and it is suggested that small dust particles, carried to the level of the cirrus clouds, may have served as nuclei for the formation of ice crystals.

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Arabic Source of Zadith's "Tabula Chemica".

THE basal texts of the alchemical knowledge of the Middle Ages in Europe are the "Turba Philosophorum" and the "Tabula Chemica" of Senior Zadith, son of Hamuel; but although both of them are obviously derived from Arabic sources, the latter have not hitherto been traced. Some twenty-five years ago an Arabic manuscript containing three of the works—two in verse and the other in prose—of the tenth century alchemist Muhammad bin Umail came into our possession from Lucknow, and the work in prose, entitled "Al-Mā'al-Waraqī wa-l-Arḍ an-Najmiyah" ("Silvery Water and Starry Earth"), was cursorily examined, as—being largely a compendium of quotations from older alchemical writers—it seemed likely to throw some light on a similar work (the "Shawāhid") of the well-known authority on alchemy, Muhammad bin Zakarīya ar-Rāzī, who died in A.D. 925. As, however, no connexion could at the time be established between the two works, and the Indian text was somewhat defective, the manuscript was put on one side until its collation with other manuscripts of the same work could be made.

This was not found possible until 1926, when the grant of a research scholarship by the Government of Bengal to Maulvi Turāb 'Alī enabled the work of collating the Indian text with photostat copies of two other manuscripts—one at Paris and the other at Leningrad—to be taken up. It was then noticed by one of us (H. E. S., while on leave in England in 1927) that the contents of the "Mā'al-Waraqī" were very similar to the treatise of Senior Zadith, and comparison of the Latin text in vol. vi. of Zetzner's "Theatrum Chemicum" (Strasbourg, 1659) showed not only the identity of the two texts, Latin and the first half of the Arabic, but also that both were a commentary on one of the poems contained in the Lucknow manuscript, and, partially, also in the treatise of Senior. The name of this poem is "Risālatu-sh-Shams ila-l-Hilāli", which appears in the Latin under the literal translation "Epistola Solis ad Lunam Crescentem". A portion of the Latin translation of the "Mā'al-Waraqī" was also found to be included in the compendium of alchemical treatises known as "Artis Auriferæ quam chemiam vocant" (1593 ed.; pp. 246-256) under the incorrect title "Rosinus ad Euthiciam". This last-named volume includes two versions of the "Turba Philosophorum", and it was next noticed that the latter work includes at least three passages that are to be found in the "Mā'al-Waraqī". Finally it was discovered that not only had the author of the "Mā'al-Waraqī" drawn some of his materials from both Ar-Rāzī's "Shawāhid" and another treatise by Ar-Rāzī's immediate predecessor, Mahrārīs, but also that the fourteenth century treatise of the Arabic alchemist al-'Irāqī, "Kitāb al-'Ilm al-Muktasab fī Zira'at adh-Dhahab" (edited and translated by Dr. E. J. Holmyard in 1923), was largely based on the "Mā'al-Waraqī".

A paper on the subject (which will include both Maulvi Turāb 'Alī's recension of the Arabic text as well as an edition of Senior Zadith's "Tabula Chemica") is now being published in the *Memoirs of the Asiatic Society of Bengal*, and an account of the recent discoveries, which throw much light on the history of chemistry, will be given at the Second International Congress of the History of Science and Technology that will be held at South Kensington at the end of June.

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Writers' Buildings, Calcutta.

M. HIDAYAT HUSAIN.

Calcutta Madrasah,
April 14.

Two Modifications of Liquid Carbon Disulphide.

THE data of H. Isnardi [1] show that the dielectric constant of carbon disulphide undergoes at the temperature of −90° C. a sudden change. This phenomenon appears at a considerably higher temperature than the freezing point of carbon disulphide (−112°); it is thus similar to ethyl ether. On the basis of our work on ethyl ether we may therefore suppose that the carbon disulphide undergoes at −90° C. a transformation from one liquid modification into another one.

To confirm this assumption, we have made a study