

effect of reducing the wave-length of the light and thus increases resolution. The illumination of opaque objects or dark-ground illumination utilises the whole aperture of a microscope because the object acts as a self-luminous body. With transparent objects the resolution is profoundly influenced by the illumination. The correct method of providing this with a substage condenser was discussed in its various aspects, and its relation to glare and the difficulties of delineating almost transparent structures considered.

Mr. H. Wrighton spoke on "Some Details in Metallurgical Microscopy" and went rather fully into the matter of illumination. Dr. Rogers discussed test objects for metallurgical microscopy. Microscopists have had for a long time a number of test objects by which the comparative merit of a lens can be readily ascertained. To metallurgists, pearlite is most commonly available. For powers of 1000 and upwards, stainless steel was suggested. The final paper was by Mr. W. J. Rees on the micro-examination of refractory materials. There are three methods available. The examination of thin transparent sections by transmitted light by the application of normal petrographic technique. The examination of flat polished surfaces by reflected light, which is difficult to apply on account of the friability of most refractories; the comparative effects obtained by the use of etching reagents such as hydrofluoric acid, are not sufficient to distinguish many common constituents. The examination of powdered materials is especially useful in the examination of silica bricks and of fused alumina-silica refractories.

Sir Robert Hadfield proposed that representations should be made to the Royal Society that the Sorby Research Fellowships should be used for the furtherance of metallurgical microscopy by research on the question of higher magnification and better resolution. The official proceedings closed with votes of thanks to the Lord Mayor, the Vice-Chancellor of the University, Sir Robert Hadfield, and the Local Committee. Parties of members spent the afternoon in visits to the works of Messrs. Hadfields, Cammel Laird, and Joseph Rodgers.

Throughout the Conference an excellent trade exhibition of microscopical and cognate apparatus was open in the Chemistry and Physics Laboratories of the University. Of many excellent and dazzling instruments it would seem invidious to mention any particular exhibit. At the same time a number of novelties attracted a great deal of attention, and in the circumstances it was natural that these should be of particular service in metallurgical work. Messrs. Beck's exhibit included a "Radial" photomicrographic apparatus of great convenience and rigidity. Messrs. Chapman and Alldridge showed some of their vertical illuminators at work, Messrs. J. W. Ogilvy showed amongst other items a 16 mm. oil-immersion objective, and Messrs. Swift a micro-goniometer.

The "Honey-Sense" of Bees.

A RECENT paper by Frisch¹ records some interesting observations on the manner in which bees notify to members of the same hive the existence of a rich source of honey. By the use of a glass-fronted observation hive and by marking the bees with various combinations of coloured spots, Frisch states that he found that a bee which had just returned from an exceptional source of supply, performed a rapid dance lasting from thirty to sixty seconds. This might be repeated in one or more places in the hive, during which the performing bee

¹ K. v. Frisch, "Sinnesphysiologie und Sprache der Bienen." (Berlin: Julius Springer, 1924.) 1-20 gold marks.

necessarily came in contact with the surrounding insects, and it was observed that these latter stroked the abdomen of the dancing bee with their antennæ. Afterwards these same bees emerge from the hive and search in ever-widening circles, up to a kilometre away from the hive, for the source of honey the existence of which has been communicated to them in the manner described.

Experiments showed that in this search the bees are in part guided by the flower scent associated with their informant. After collecting their honey-loads they in their turn regain the hive and exhibit the same dancing movements, thereby enlisting additional recruits for the exploitation of their find. But the number of bees thus brought is more or less proportional to the honey supply as, if access to an artificial source of honey is rendered difficult, the returning bees do not dance and no addition is made to the numbers collecting from this source.

From the greater ease which Frisch experienced in training bees to scent as compared with colour, and from the fact that recruits came to scented but not to scentless flowers, he concludes that scent is more important than colour. This view, whilst in agreement with that of Plateau, is at variance with the conclusions of Wery, who found that flowers which were completely enclosed in glass globes attracted bees as readily as those exposed. Frisch's views on the importance of scent and the seat of this sense in the antennæ is difficult to reconcile with Forel's experience that bees from which the antennæ had been removed visited flowers with even greater precision than un mutilated individuals. In addition to the flower-scent perceived by recruits as attaching to the returning bees, Frisch adduces evidence to show that the bee possesses a scent-gland by means of which it secretes a volatile substance at the honey source, and this, together with the scent of the flower, guides the recruits to their destination.

Pollen-collecting bees likewise perform a dance when returning from a rich source of pollen, but this is stated to differ in character from that performed by the honey-collectors. Here too the recruits are guided both by the pollen scent and the scent secreted by the recruiting bee.

E. J. S.

University and Educational Intelligence.

CAMBRIDGE.—The trustees of the Captain Scott Memorial Fund have offered to hand over to the University a sum of about 13,000*l.* for the erection, endowment, and maintenance of the "Captain Scott Polar Research Institute." They suggest that 6000*l.* be set aside for the building and its upkeep, indicating that there are clear advantages in the Institute being a wing of a departmental building; presumably the Trustees have the Department of Geography in mind, and it may be hoped that this gift may stimulate into success the endeavours that have been made to secure adequate accommodation for the Department. The Council is to propose a Grace gratefully accepting the proposed gift.

Lord Ullswater, chairman of the Cambridge University Commissioners, has informed the Vice-chancellor that in order to enable the Commissioners to organise a Faculty system for the University, as proposed by the recent Royal Commission, and also in order to meet some of the most pressing needs of the Library, the Government has increased the annual state grant from 60,000*l.* to 85,000*l.*

Dr. J. H. Jeans, Trinity College, will deliver the lecture on the Rouse Ball foundation on May 11, his subject being "Atomicity and the Quantum Theory."