A New Subtractive Colour Film

THE Eastman Kodak Company has introduced a new 16 mm. cinematograph colour film. This is known as the Kodachrome film. It differs from many other colour films now available in that the colour effects are produced 'subtractively'. The superimposition of 'minus' colours is used to yield the final colour. For example, a blue is produced by placing a minus green (magenta) on a blue-green (minus red), green by minus blue (yellow) on a minus red and so on. This is, of course, the ordinary principle of three-colour printing, but to apply it to this process has involved the use of a film coated in three layers. Each of these layers records one of the primary colours only. The top layer is sensitive to blue and transmits only green and red; the second layer records green and transmits red, while the last layer of all records only red. The film is exposed in the ordinary way and has a sensitivity which is said to be about half that of the normal film used for black-and-white cinematography. Processing is divided into a number of separate processes: (1) Development to negative. (2) Bleaching and clearing to get rid of the developed silver. (3) Exposure and redevelopment to positive. This redevelopment is carried out with a 'dye-coupling developer' which attaches a blue-green dye to the silver produced by development. All three layers are treated indiscriminately up to this point. Then follow further stages. (4) Bleaching the two upper layers; silver chloride is formed in place of the silver in these layers and the blue-green dye in them is destroyed. (5) Exposure and redevelopment of the two upper layers with a magenta coupling developer. (6) Bleaching the top layer and destroying the magenta dye. (7) Exposure and development of the top layer with a yellow coupling developer. The pictures so formed are continuous in tone.

Spelæological Research in Great Britain

A PROPOSAL to form a central organisation for the co-ordination of research in the caves and pot-holes of Britain is to be discussed at an inaugural meeting to be held on July 27 at the Museum, The Wardwick, Derby. Among those taking an active part in forwarding the movement are Prof. L. S. Palmer (Hull), Mr. A. Leslie Armstrong (Sheffield), Dr. J. W. Jackson (Manchester), Dr. A. Raistrick (Durham), Mr. H. Brodrick (Birkdale), and Mr. C. R. Hewer (Bristol University Spelæological Society). Prof. L. S. Palmer will act as chairman of the meeting, when aims and methods which will best promote systematic exploration of British caves on comprehensive lines, embracing all relevant forms of evidence, will be discussed. The proposal most favoured at present is the constitution of a British Spelæological Association, which would lead the way to a standardisation of technique and afford opportunity for co-ordination of results. Cave exploration in Britain has by no means been neglected, as the exploration of Kent's Cavern, Torquay, and Boyd Dawkins' classic work on "Cave Hunting" bear witness. The pot-holes clubs and antiquarian societies of the north of England have devoted considerable attention to it, and the activities of the Bristol University Spelæological Society, Mr. Leslie Armstrong and Prof. Palmer have been remarkably fruitful in additions to archæological knowledge, especially of the palæolithic period. It is felt, however, that co-operation between individuals and organisations interested in the problems of cave-dwelling man and his environment will facilitate further research and preserve the enthusiasm of explorers from unprofitable, and even harmful, activity by ensuring greater uniformity in the observance of scientific methods of exploration—a view in which archæologists, at least, will heartily concur.

Lulham Memorial Fund

MISS ROSALIE LULHAM, who died on December 28, 1934, was well known as a field naturalist and for her work as a teacher of natural history. During the last year of her life she was actively concerned in planning a course of training in natural history for students, teachers and others with previous scientific training, who, to quote her own words, "wish to make that practical study of living things both outdoors and indoors, which would enable them to teach live Natural History, making it the absorbing and enlightening subject it may be". Such a course of training is being established at the Froebel Institute, where she worked for thirty-eight years, and where the tradition of her teaching is living and growing in the Natural History Department built up by her efforts. The College of the Institute at Roehampton Lane, London, S.W.15, with its spacious grounds and its proximity to Richmond Park, offers excellent scope for practical study in natural history, and it has been suggested that a Lulham Memorial Fund be opened with the object of equipping the Science Department for advanced study in natural history. We trust that this appeal will meet with ready response not only from those who, directly or indirectly, shared the inspiration of her teaching, but also from those who believe that there is a real educational need for encouraging the teaching of biology through the study of living Nature. Donations should be sent to Dr. A. B. Rendle, c/o British Museum (Natural History), Cromwell Road, London, S.W.

Television in the Cinema

CAPTAIN A. G. WEST, of the Baird Television Co., Ltd., gave a very instructive address to the Cinematograph Exhibitors' Association at Cardiff on June 26. A summary of this address appears in the *Electrician* for July 5. He pointed out that the only possible waves that can be used to produce high-definition pictures are ultra-short waves the lengths of which are not greater than 10 metres. If a 6-metre length is used, then the necessary breadth of the band need lie only between 5·9 metres and 6·1 metres. If it be operated on 300 metres, it would interfere with many of the broadcasting stations in Europe. Ultra-short waves have almost the same properties as waves of light and thus cast shadows. The transmitting aerials on the top of the Crystal Palace tower are