Castle Smolenice is situated at the foot of the Lower Carpathian mountains and is in a beautiful countryside. It now provides both a holiday resort and a meeting-place for scientists and is maintained by the Slovak Academy of Science. Apart from the scientific programme there was a well-arranged ladies programme and an excursion to Bratislava for all members of the Symposium.

W. A. WOOSTER

BRITISH LEATHER MANUFACTURERS' RESEARCH ASSOCIATION

DURING the open days at the Egham Laboratories of the British Leather Manufacturers' Research Association, which were held during May 12–14, members of the staff gave short lectures on subjects of particular interest.

Dr. J. H. Bowes spoke about hides from intensive feeding trials and other accelerated stock-raising methods; in composition and leather-making characteristics they resemble the lighter hides from normally fed animals of the same age. In the hair-loosening process, one of the most critical stages of leather manufacturing, alkaline unhairing treatments loosen the keratin structure by breaking its disulphide links while enzyme methods mostly act by dissolving non-keratinous protein around the hair bulb so that the hair can be pulled from the follicle. These procedures are being re-examined by the Biology and Biochemistry Departments, one object being to diminish the effluent problem caused by waste unhairing liquors.

Other work arising from effluent problems was described by Dr. R. G. Mitton, who described the complete utilization of vegetable tanning liquors with no discharge of wastes and by Mr. D. A. Bailey, who dealt with chlorination and aeration of waste sulphide liquors. In addition to work on effluent problems the Chemical Engineering Department continues its investigations into drying leather. The efficiency (in heat and power) of vacuum drying has been examined and was described by Dr. F. E. Humphreys.

In the Association's first quarter-century, the research programme was mainly occupied with investigations of leather-making processes; but more attention is directed nowadays to finishing processes and to the properties of leather which are important to users. Mr. T. J. Bickerton outlined the problems met with in dyeing (many of which are due to resistance to wetting in areas where fatty compounds persist from the original skin), and Mr. A. W. Landmann discussed the new methods of applying pigmented finishes (in particular the mechanized 'curtain-coating', which has been adopted from the timber-finishing industry). Miss B. M. Haines spoke on adhesives for leather and the preparation of leather for cementing, a very important subject in many uses of leather. It is for example, essential that adhesives used in suède and grain leather garments shall be resistant to dry-cleaning solvents.

In the Chemistry Department, the display of work on the organic chemistry of tannins dealt with the reactivity of 3 : 4 diol flavonoid compounds, from natural sources or synthetic. The Physics Department showed new tests which are being developed for various properties of leather, and the continuation of work on waterproofing and heat-setting (moulding to shape) of upper and clothing leather. Dr. J. H. Bowes spoke on the recently completed project (sponsored by the U.S. Department of Agriculture) on the resistance of leather to de-tanning treatments and the chemical stability of collagen and leather fibres. A new contract has been awarded by the Department of Agriculture for work in the Biochemistry Department on compounds which react chemically with collagen and can be used to improve the characteristics of leather.

M. P. BALFE

FLAME-RESISTANT RUBBERIZED HAIR

FOR many years natural rubber latex has been used for bonding fibres together in various forms to produce packaging and particularly upholstery filling materials. Curled animal hair is most commonly used for this purpose, the popular material being hog hair blended with small proportions of longer hair derived from cattle tails, horse tails and manes. For packaging, at least 80 per cent hog hair is normally specified. Alternatively, certain vegetable fibres, such as coir (coconut fibre), used alone or blended with sisal, are suitable for some applications. The function of the latex as bonding agent is to improve load-carrying capacity, resilience and resistance to compression. For domestic upholstery and private transport, in conjunction with springs, these rubberized materials have withstood the test of time; latterly their use has found favour for packaging radio and electronic instruments and other fragile equipment.

According to E. G. Pole, in an article in *Rubber Developments* (quarterly journal of the Natural Rubber Producers' Research Association, Malayan Rubber Fund Board, **17**, No. 1; 1964): "It has been suggested that usage could be further expanded into new and virtually untapped markets, such as that of public transport seating, if only flame-resistant properties could be added to the already excellent physical properties of natural rubber bonded hair pads".

The use of certain combustion retarding materials, for example, ammonium salts, borates, metallic oxides, chlorinated hydrocarbons, with natural rubber latex, has been recognized for some years past, but high levels of these compounds are required and it has been found that the elastic properties of the products involved in this treatment are adversely affected. Natural rubber can now be modified chemically to give more permanent flame-resistant properties without impairing the elastomeric characteristics of rubber latex by reacting it with polyhalogenated compounds in the presence of suitable catalysts. Trichlorobromomethane is the preferred compound and it is stated: "The reaction . . . proceeds nearly to completion at room temperature and can thus be regarded as a maturation or compounding step in the preparation of a latex compound suitable for the production of flame-resistant rubberized hair".

It has been found that the optimum combination of flame-resistance and good physical properties in the modified rubber is obtained when latex is compounded with between 14 and 20 parts by weight of trichlorobromomethane per 100 parts by weight of rubber.

The article gives both recipe and procedure for production of rubberized hair with good flame-resistant properties, together with relevant illustrations and appropriate references.