DEPARTMENTS OF TEXTILE INDUSTRIES AND COLOUR CHEMISTRY AND DYEING, UNIVERSITY OF LEEDS

REPORTS FOR 1950-52

'HE Advisory Committee on the Departments of Textile Industries and Colour Chemistry and Dyeing of the University of Leeds has made two reports, for the sessions 1950-51 and 1951-52, respectively, to the Worshipful Company of Cloth-workers of the City of London*. That for the session 1950-51 refers to continued excessive pressure on accommodation. In the Department of Textile Industries, where students will in future be able to read for honours degrees in textile physics, textile chemistry or textile engineering, the equipment of all sections is now in excellent condition, permitting both teaching and research on the most modern machinery. In the textile physics section the electron microscope has been used for examining keratin and also the disintegration of cellulose fibres in strong mineral acids. A further laboratory has been equipped for teaching and routine work on the examination of fibres by the microscope and other optical methods, and in the weaving section progress is reported in studies of cloth-setting and the influence of structural differences, in respect of yarn, weave interlacing and sett, on the properties of woven fabrics. In the finishing section, besides work on the action of metal amines on proteins, the properties of viscose rayon containing vinyl polymers have been examined with the object of developing methods for producing dimensionally stable rayon fabrics. Work in the textile chemistry section has dealt with the behaviour of the alcohols and esters of wool wax at the air-water interface, variation in sulphur content and plasticity among wool fibres, the swelling of keratin, the dissolution of wool and the action of neutral salts on animal fibres. In the Department of Colour Chemistry and Dyeing, progress is reported in the study of the self-union of organic compounds such as mesobenzanthrones and pyrazoleanthrones, a satisfactory explanation of the mechanism of formation of flavanthrone in the alkali fusion of 2-aminoanthroquinone has been obtained, and an investigation of the substitution of cinnoline, phthalazine, quinoxaline and quinazoline by anions was commenced. Lists of publications are included.

The report for the session 1951-52 reports a record number of students in the Department of Textile Industries and a further increase in students in the Department of Colour Chemistry and Dyeing, where two new scholarships for research in colour chemistry have been endowed, as well as two new studentships. In the textile physics section an ultrasonic technique was being applied to both keratin and cellulose, and a new type of rotating vacuum seal being developed for use in interpreting the molecular structure of keratin. In the textile chemistry section conclusive proof has been obtained that the variation in plasticity among the fibres in a single staple is associated with the age of the follicles from which they are

* University of Leeds. Report to the Worshipful Company of Clothworkers of the City of London of the Advisory Committee on Departments of Textile Industries and Colour Chemistry and Dyeing during the Session 1950-51. Pp. 41. Report for the Session 1951-52. Pp. 38. (University of Leeds, 1951-52.)

derived, and the formation of cross-linked polymers inside wool fibres by co-polymerization of compounds such as divinyl ether and methacrylic acid has been studied, while methods were being devised for weighting the different types of side-chains with heavy metal atoms so that their distribution could be determined by X-ray examination of the treated fibre. Two quantitative methods of estimating the amount of medulla in hairy wools have been discovered, and in textile engineering the performance of the prototype electronic mule has been so satisfactory that the first large-scale model was being built for trial in a Yorkshire mill. The action of metal amines on wool and other proteins and the influence of various treatments on the dyeing properties of wool was being examined in the textile technology section in co-operation with the Depart-ment of Colour Chemistry and Dyeing. Other problems being investigated included the bleaching of pigmented fibres, the setting of nylon, and the assessment of damage in textile materials.

In the Department of Colour Chemistry and Dyeing work on the constitution of the anthraquinone-carbazole dyes and the mechanism of their formation points to the possibility of a general theory of reactions involving condensation of organic com-pounds by hydrogenation. A study of the condensation of amines with aromatic nitro-compounds was commenced, and an investigation of the reduction of anthraquinone derivatives with alkaline sodium dithionite, which indicates an unexpectedly frequent formation of anthrones, has a direct bearing on the application of vat dyes. Work on the preparation and orientation of the *tert*.-butyl derivatives of acenaphthene was completed, and that continued on the resolution of *dl*-mandelic acid and its derivatives into optically active forms on wool and on the chemical and physical factors concerned in the application of dispersed dyes to cellulose acetate ravon.

A NATURALIST IN SOUTHERN ETHIOPIA

R. HUGH SCOTT, who has just returned from yet another journey to Abyssinia, has placed in his debt everyone whose scientific interests include this remarkable part of the world. On his expedition of 1948-49, which is dealt with in a recent paper*, as on his first, Dr. Scott's main purpose was to collect insects at high altitudes; but incidentally he acquired a great deal of information about the country and its inhabitants. Much of the area he passed through was little known and it was exceedingly ill-documented, especially in English; therefore the account that he gives of the topography, vegetation and climate provides, in addition to an account of a naturalist's journey, as fascinating in itself as his account of the Yemen ("In the High Yemen." 2nd edit., 1949), an invaluable background to any biological work concerned with the area traversed. The text is supported by a good bibliography, and a special feature of the paper is the twenty-six plates, illustrating a variety of subjects of interest to the botanist, ethnologist and geographer.

* Journey to the Gughé Highlands (Southern Ethiopia), 1948-49; Biogeographical Research at High Altitudes. By Dr. Hugh Scott. Proc. Linn. Soc., Session 163, 1950-53. Pp. 85-189 +26 plates. Dr. Scott reached Addis Ababa on August 20, 1948; but the unusually heavy rains had done so much damage to the roads he wished to traverse that he was not able to start until October 15. He returned to the capital on January 28, 1949, after a remarkable journey, with no European companion, which took him to within about seventy miles of the Kenya border. His main objective was the high ground west of the Rift Valley, Mt. Damota (10,400 ft.) and the almost legendary Gughé Highlands, rising to 13,780 ft. He continued south through Konso to Yavello and returned to his base up the eastern side of the Rift. It is pleasant to record that on his 1948-49 journey Dr. Scott found public security much better than it had been when he was travelling in the country during 1926-27.

The account of the journey is prefaced by a section on "Biogeographical Considerations", in which Dr. Scott briefly considers the "zones of vegetation in southern Ethiopia" (with special reference to those on the mountains he personally explored) in relation to published information about the biology of mountain country elsewhere in Africa. In this connexion he discusses certain groups of Coleoptera in which he is a specialist; and also the effects of isolation on the evolution of congeneric species, together with the parallel evolution of certain insects along with the high-mountain plants with which they are so closely associated.

Although his main task in Ethiopia was the collection of observations on and specimens of insects, Dr. Hugh Scott made a most useful botanical collection. Hitherto, nothing much was known of the vegetation of Mt. Damota and the Gughé Highlands, and no collections of plants from these mountains had ever been made. Dr. Scott is to be congratulated on bringing home many plant specimens in such an excellent state of preservation that one might have imagined that they had been taken and prepared under ideal conditions. This, however, is far from the truth, for much of the time that he was at high altitudes, Dr. Scott was working under very austere and unpleasant conditions. The Gughé Highlands in particular are notoriously wet. That Dr. Scott endured "raw, damp weather, with thunder on two nights" when camping at about 10,600 ft. on Mt. Tola, is certainly not reflected in the specimens he obtained.

Botanically the chief interest in the collection is that it comes from an area situated between the Simien Highlands, so well collected by German and French collectors in the first half of the past century, and the highlands of Kenya, the flora of which is now comparatively well known. When Dr. Scott's plant collections are finally worked out, the preliminary determinations of which are listed at the end of his paper, many gaps in our knowledge of the distribution of plants on the mountains of Africa will have been filled.

About half the paper is taken up with the "Description of the Country, with Natural History Notes", to which are added three appendixes. The most important of these deals with the author's archæological and ethnological observations, with special reference to the phallic monoliths of Walāmo and Sidāmo. These exist in thousands, many of them up to ten feet in height, yet they are very little known. In his main narrative Dr. Scott gives full rein to his very wide natural history and human interests. They range from the Addis Ababa gardens, and the butterflies and birds that frequent them, to

the spread of prickly pear, the practices of the local bee-keepers and the uses made of the local bamboos. He found almost everywhere that extensive inroads had been made into the native vegetation, and that in places cultivation had been carried right up to 10,000 ft. Yet in parts of the south, splendid primary forests still exist. He gives, of course, special importance in his narrative to the mountain massifs that were his principal objective; and anyone who has had the good fortune to be a pioneer in any branch of biological exploration in an unknown locality will live again with him the enthusiasm with which he toiled up those distant slopes. R. E. MOREAU

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GRAZING BEHAVIOUR OF BULLOCKS

ENVIRONMENTAL factors which can influence the behaviour of a herd of bullocks may be divided into, first, the natural conditions of climate, including seasonal changes and weather; and secondly, the system of management of the bullocks.

Methods of management, the ways in which grass, in different quantities and of varying quality and palatability, is offered to the beasts, fall into two categories. The grazing may be uninterrupted from day to day, as in free-range and rotational systems. Other methods exercise some form of daily control over the quantity of herbage allowed the bullocks, which may be a control of area or of time allowed on the grass. In a recent article, J. C. Tayler, of the Grassland Research Station, Stratford-on-Avon, has described the behaviour of Hereford-cross bullocks under two management systems in these categories (*Brit. J. Animal Behaviour*, 1, No. 2; April 1953).

(Brit. J. Animal Behaviour, 1, No. 2; April 1953). These studies have shown that the grazing behaviour of bullocks in a herd may be regarded as following a repeated daily pattern closely related to environmental factors. Of these factors, the varying hours of daylight throughout the year produce seasonal changes in the basic pattern. Weather and other disturbances may affect the grazing pattern in many minor ways; but, next to seasonal effects, those resulting from the system of management seem to be the most important.

Under the two systems of management, 'rotational' and 'strip' grazing, changes in behaviour resulting from the system may be due to the herbage, through its physical, internal effect as, for example, in winter grazing on limited areas. They may also be due to a daily disturbance as was shown in the 'strip folding' system. Under this system of management the animals show definite signs of appreciating that a fresh supply of grass will be offered later in the morning and delay their main grazing period up to six hours later than it would occur under undisturbed conditions.

Studies of behaviour during the past three years have been used at the Grassland Research Station for improving the accuracy of results in live-weightincrease experiments where bullocks are weighed straight from pasture. A knowledge of their behaviour pattern makes it possible to remove the bullocks from pasture for weighing when the 'fill' of grass in the rumen is approximately the same at each weighing.