

The study of the raw-wool-scouring process, mentioned in last year's annual report, has been continued by the Research Chemist, Mr. R. V. Peryman, and detailed reports sent to the remaining eight mills. In continuance of this work numerous chemical analyses of scoured wool for grease, soap, and alkali contents have been carried out. The analysis of wool oils has been another major investigation, and an interim report has been circulated. The work on oils is still proceeding.

Studies have also been made by Mr. H. D. Purvis, M.Sc., in the Bacteriological Department of Otago University in connection with the problem of wool-damage by micro-organisms. The animal enzyme trypsin was found to act similarly to the proteolytic enzymes of bacteria, as judged by microscopical examination of wool fibres. The native wool fibre was found to be quite resistant to the action of trypsin except for local points of weakness. Ultraviolet light and treatment with alkaline solutions render the fibre susceptible to the action of trypsin. It is found that these two types of damage can be readily differentiated microscopically by staining reactions. The most interesting results have been obtained from the observation of the effect of mechanical stretching on the resistance of wool fibres to trypsin, for which purpose a special technique has been developed. Among other results it has been found that elongation of the fibre greatly increases the susceptibility to enzyme attack. These experiments are being continued.

Numerous service problems have been submitted by the mills, including the diagnosis of stains; acid and alkali damage; insect and bacterial damage; and the analysis of carbonizing liquor and boiler-feed water. A constant-temperature-constant-humidity room is now in operation for routine test work.

Bulletins are circulated each month dealing with information of interest to members. During the year the subjects discussed have included "Bacterial Attack of Woollen Goods," "Stains," "Comfort in Clothing," "Wool Oils," "Notes on the Wool Industry," "Bleaching of Wool," "The New Rubberizing Process," "Carbonizing Liquors."

There has been one alteration in the staff. Miss Davies, M.H.Sc., desiring to continue her studies at Melbourne University, resigned the secretaryship, and Miss Fenwick, B.A., was appointed on 14th March, 1939.

RADIO RESEARCH.

Advisory Committee: Professor James Shelley (Chairman), Professors P. W. Burbidge (Auckland), D. C. H. Florance (Wellington), R. Jack (Dunedin), F. W. G. White (Christchurch), Squadron-Leader E. M. F. Grundy (Air Department), Captain G. H. Heal, N.Z.S.C., Army Headquarters, Messrs. E. H. R. Green (Post and Telegraph Department), J. R. Smith (National Broadcasting Service), and Dr. M. A. F. Barnett (Department of Scientific and Industrial Research).

When allowance is made for the difficulty which has been experienced in the appointment of officers with the requisite specialized qualifications for the investigations to be undertaken, very satisfactory progress has been made during the year with the radio research programme.

At the meeting of the International Scientific Radio Union held at Venice in September, 1938, the Committee was represented by Mr. J. A. Ratcliffe, of Cambridge University. Mr. Ratcliffe forwarded a very useful report of the proceedings of the Union, and this is at present being circulated to members of the Committee.

During March, 1939, Dr. L. V. Berkner, of the Department of Terrestrial Magnetism, Carnegie Institution of Washington, spent a short time in the Dominion and visited the four main centres. Dr. Berkner is a radio research worker of high standing, particularly in the ionospheric field, and his visit proved of very great benefit. He gave a lecture in each centre and spent a considerable time in discussing radio research problems with the New Zealand workers.

As regards the actual research work, three main lines have been pursued, and these will be reviewed briefly in turn.

Ionospheric Investigations.—The critical frequency of the F region and E region of the ionosphere has been measured at Christchurch at hourly intervals from 9 a.m. to 6 p.m. and on international days during the twenty-four hours, while at Wellington noon measurements have been made every day and less regular observations carried out at other periods. Automatic-recording equipment which was made in Australia has been installed at Canterbury University College. Data have now been accumulated from October, 1937, onwards, and arrangements are being made for a systematic exchange of this information with observatories in other parts of the world. A satisfactory solution of the physical problems involved can result only from a study of a world picture of the changes that are taking place. It is proposed to publish the present data in a bulletin which will describe the observed phenomena to date.

During the year Mr. T. W. Straker, a part-time worker at Canterbury University College, investigated the diurnal variation of the absorption of wireless waves in the E region. The measurements were carried out in mid-winter and in mid-summer. It was found that the changes in absorption were in conformity with Appleton's theory as regards the daily variation, but that the annual effect from summer to winter did not follow the theoretical law. A paper describing this work and suggesting an explanation of the discrepancy has been sent to England for communication to the Physical Society of London.

From the point of view of an ionospheric observatory in New Zealand it is important to know the relative positions of the observatory and the zone of maximum auroral frequency. With the object of determining the position of this zone Professor F. W. G. White has made an examination of the information collected by scientific expeditions to the Antarctic. Although the data are not altogether suitable the desired result has been achieved to some extent. A collection of the early observations up to 1900, has been published in the *New Zealand Journal of Science and Technology*, under the