

oxidant, nordehydroguaiaretic acid, reduced the amount of oxidation in butter during eight months of storage, but without improving the grade of butter. Of twenty overseas strains of streptococci examined, none was suitable for use as a cheese-starter in New Zealand. The Woollen Mills' Research Association made comparative tests with six worsted oils and also found that 'Lissapol N' in scouring removed the mineral oils satisfactorily. It was also found that 0.01 per cent of copper was the maximum amount that could be tolerated on the wool in dyeing, and even this amount noticeably affected weak dyeings of sensitive dyes.

QUALITY CONTROL OF LINOLEUM

ON January 31 the Linoleum Research Council, which has only been in existence for not quite three years, held its second symposium at the Grosvenor Hotel, London. The subject on this occasion was "Quality Control" as applied to linoleum, and not only was the industry itself well represented by the gathering of its technical men but also a number of visitors from other related industries were present. The meeting was opened by Dr. K. Turner, chairman of the executive committee, who said that this meeting was a direct result of the first symposium, entitled "The Rheology of Unmatured Linoleum", which had been held in the same place two years ago and which had been sufficiently successful to merit making these meetings a regular affair. He then handed the meeting over to the superintendent of research, Dr. S. R. W. Martin.

Five papers were presented, and as preprints had been circulated well in advance it was possible to devote most of the time of the meeting to a discussion, which was extremely stimulating and constructive. The first paper, by Mr. F. T. Walker (Messrs. Michael Nairn and Co.), was entitled "Dimensional Changes of Linoleum with Varying Humidity", and outlined the effect of water absorption on the cubical expansion of linoleum at normal temperatures. It was shown that the expansion of the linoleum is directly related to the amount of water absorbed. The effect contributed by the various ingredients of linoleum has been measured, and the fibrous fillers—cork or woodflour—have been shown to be almost entirely responsible. Various physical and mechanical factors which can influence expansion due to moisture absorption were discussed, and the superficial anisotropy of the linoleum sheet resulting from calendering demonstrated.

"The Indentation Machine as an Indication of the End Part in the Process of Maturing Linoleum" was discussed by C. W. Falkner (Linoleum Manufacturing Co., Staines) as an introduction to the study of the whole subject of mechanical testing as an aid to accuracy in judging the process of maturing which forms the final stage in the manufacture of linoleum, and a comparison was made between the indentation test and chemical tests, and new tests in respect of quite new and novel instruments. A more precise description of results obtained by the use of such a new testing device was discussed by P. J. Humphris (Linoleum Manufacturing Co.) in a paper entitled "The Rigidity Modulus of Linoleum". A large-scale rigidity machine was described, and attempts have been made to correlate results obtained from this

machine with maturing times. There are clear indications that the modulus of rigidity in the case of linoleum is a sensitive property of some structural significance.

An alternative method of assessing the maturing stage of a linoleum was described by Messrs. J. C. Lawson, T. McQuillen and G. D. Rack (Jas. Williamson and Son, Ltd.) in a paper entitled "Some Experiments on the Application of Resilience Testing to Linoleum". Various common methods of measuring resilience of similar materials were discussed, and it was shown that a bouncing-ball technique and also a wheel-rebound test have given valuable results which may be a guide to the correct end of a maturing process.

An interesting paper, which was possibly outside the narrow subject of the symposium but nevertheless of interest to all present, was given by Dr. F. C. Harper (Building Research Station) on "The Measurement of Slipperiness of Floor Finishes". This described methods which have been used by various investigators for measuring slipperiness and showed how the problem can be simplified if more information is available about the mechanics of walking.

The meeting was concluded with a general summing up by Mr. A. G. Ward (director, British Glue and Gelatine Research Association). Dr. Martin thanked the company and suggested that, by the organization of such meetings where members of the industry can meet together and exchange information of material benefit, the Linoleum Research Council is amply fulfilling one of its functions by acting as a scientific centre for the industry.

PRODUCTIVITY IN THE PACKET FOODS INDUSTRY

REPORT OF THE ANGLO-AMERICAN COUNCIL ON PRODUCTIVITY

THE findings and recommendations of the productivity team representing the British packet foods industry that visited the United States last year are of interest to a wider field than those specifically concerned with food and its packaging. The recently published report of the team* does not endeavour to tell the British food industry how it should run its business, nor does it suggest that everything done in the United States is necessarily better than in Great Britain, the general conclusion appearing to be that, if in Britain there were the same unlimited supplies of materials, there would indeed be little difference in efficiency of either the foodstuffs prepared or in the quality of the packaging. Indeed, in this latter respect it seems that many of the undoubtedly superior packages and packaging methods used in the United States result from the ready availability of materials as well as the greater development of self-service stores which have called for more attractive packs in order to tempt purchasers.

Many interesting facts are presented in the report. One learns that food and agriculture in the United States is a "25 per cent industry"—one-fourth of the American income is spent on food, and the industry employs one-fourth of American workers. In the

* Productivity Team Report: Packet Foods. Report of a Visit to the U.S.A. in 1951 of a Productivity Team representing the British Packet Foods Industry. Pp. xii+71+9 plates. (London and New York: Anglo-American Council on Productivity, 1951.) 4s. 6d.

matter of expenditure on plant and equipment the only higher figure for the year is that of the chemical industry. The report deals with the question of management control and office management, and records that a surprising amount of attention is given to these matters as opposed to mechanics. On the matter of supplies, it is said that as regards raw materials the American food manufacturer lives in "a supplies paradise" and specified raw materials can be easily obtained—a matter for envy to those in Britain who for ten years have had to accept what has been given them.

In the section on production methods and factory buildings, the team stresses again the relation between paper work and the actual technique of production and directs attention to some interesting facts about the hazards of dust explosions. There is an undoubted "machine-mindedness" among American manufacturers, and volumetric filling, for example, is common, as are electrically controlled net-weighing machines. Pest control plays an important part in safeguarding packet foods, and close attention is paid to control measures by space fumigation, spraying, heat sterilization and the addition of insect repellants to carton- and case-sealing adhesives. It is claimed that this latter method reduces the incidence of infestation by half at a very low cost, a statement that occasions some surprise as comparable work in Britain does not indicate that such insecticides function satisfactorily unless the insect actually makes contact with the material used. No claims are made in Britain for any residual effects of the substance used as a repellent, although it is available and used mainly for spraying in agricultural usage where direct contact with the insect is possible.

In smaller factories in the United States it is usual to find both control and research being carried on in the same set of laboratories; but in the larger firms these functions are separated, some trouble being taken to ensure that the research worker is not thereby cut off from contact with works procedure and difficulties. Packaging materials are also subjected to known specifications, and there is excellent co-operation between suppliers and users, progress being greatly facilitated by the wide variety of flexible packaging materials freely available in the United States. The report gives details of a number of the tests used for such determinations as those of moisture, starch and sugar, gel strength, etc. Large sums of money are spent on scientific activities, and the results are there for all to see. The team states that it is fair to say that the *quality* of British work in this field is at least the equal of American work; it is to be hoped that an increasing number of British food manufacturers will take advantage of this fact and encourage the application of scientific methods throughout the industry.

In the field of industrial relations, the team was impressed by the normal friendly relations between labour and management, and employees do not appear to dislike the idea of their employers making a profit. From the section on sales and distribution, British packet food makers and others can learn much regarding the value of advertising, packaging, distribution and market research. Similarly there is much relevant information on the questions of warehousing and transport, although conditions are different in the United States.

The conclusions and recommendations of the team state, first and foremost, that American firms have attained higher productivity. The firms pay great

attention to this subject, so that American workers are required to put less physical effort into their jobs than the British—nothing is moved by hand where a machine can be made to do the work. There is a very positive attitude to work—American workers appear to have no objection to overtime, or to shift work. In the field of packaging the possibilities of foil, plastic film and other new materials used in the United States are known in Britain, but their application is restricted by prevailing economic conditions.

It is recommended that steps should be taken by all British firms to make some measurement of productivity as a basis upon which future results can be assessed. Mechanization should be introduced wherever possible, and the whole production line, not single units, studied.

British food manufacturers, says the team, should make certain that the knowledge gained through research is given practical application in the factory. This recommendation can be taken to heart by manufacturers other than of foodstuffs.

Stress is given to the necessity for attractiveness and individuality of packages, and the final recommendation is that an American team should visit Britain. The report contains a number of flow sheets relative to the food industry, and illustrations of various weighing, stacking and packaging machinery. It forms a valuable and informative document which should do much to help the British food industry to further progress.

JAMES LAWRIE

1851 EXHIBITION SCHOLARS

LAST year, towards the end of the Festival of Britain, a "Record of the Science Research Scholars of the Royal Commission for the Exhibition of 1851"* was published which, as the title implies, contains a list up to 1950 of all who have held 1851 Exhibition scholarships. Not the least of the great success of the 1851 Exhibition was the fact that it made a handsome profit; and the memory of its principal organizer, the Prince Consort, to which on the scientific side must be coupled the name of Lord Playfair, is enhanced by the many worthy uses to which the money was put. One such project was the scholarship scheme, and, from the time of its somewhat tardy inception in 1891, the scheme has been an unqualified success, as the list of nearly eight hundred scholars in this publication amply bears out.

In a foreword, Sir Robert Robinson, chairman of the Commissioners' Science Scholarship Committee and himself once an 1851 Exhibition scholar, points out that seventy-five scholars have been elected to the Royal Society and six have won Nobel Prizes. Modestly, he does not mention the Nobel Laureates by name, for he himself is numbered among them, having gained the award for chemistry in 1947. The other Laureates are C. G. Barkla (physics, 1917), Sir James Chadwick (physics, 1935), P. A. M. Dirac (physics, 1933), Sir Norman Haworth (chemistry, 1937) and Lord Rutherford (chemistry, 1907); since the list was published another name may be added—E. T. S. Walton (physics, 1951). The booklet starts with two indexes, one of scholars and the other of institutions which have made successful recommendations for awards. Then comes the main part of the

* Record of the Science Research Scholars of the Royal Commission for the Exhibition of 1851. Pp. 92. (The Commissioners, 1 Lowther Gardens, Exhibition Road, London, S.W.7, 1951.) 7s. 6d.