

Progress in Grass Drying

At the second Congress of Mechanised Farming held at Rhodes House, Oxford, on January 5-8, when recent developments were described, a paper by Mr. E. J. Roberts on "A Year's Progress in Grass Drying" excited much interest. A résumé of this paper is published in *Engineering* of February 5. The author points out that whereas there were only six driers in operation in 1935, there were 46 by the end of the 1936 season. The engineering difficulties in connexion with drying plant have been successfully overcome. This is confirmed by papers at the Congress giving the experience of users. We know that inventors are busy developing new methods and rapid progress in this direction will doubtless soon be made. For the year just closed it is expected that the production will be 10,000 tons. In the United States for the same period, it was 50,000 tons. In countries abroad the usual practice is to dry the grass in large centralized units. In Great Britain, in general, only small localized units are used. This is a pity as it is not the most economical method. In a paper read at the conference by Prof. J. A. Scott Watson, it was shown that the remaining problems are to bring down the cost of the drying plant, the fuel cost and the labour cost and to increase the output. Mr. Roberts in his paper stated that one large drier evaporated 9 cwt. of water with 1 cwt. of coal for a short period and worked at a normal figure of 8 cwt. Smaller driers give efficiencies of $3\frac{1}{2}$ - $5\frac{1}{2}$ cwt. of water per cwt. of coke. If we take the calorific value of the coal to be 14,000 B.Th.U. and that of the coke to be 13,000 B.Th.U., the advantage lies greatly in favour of the large drier.

Testing Broadcasting Receivers

At an informal meeting of the Wireless Section of the Institution of Electrical Engineers held in November 1935, Dr. R. L. Smith-Rose opened a discussion on the methods of examining the performance of wireless sets used for the reception of broadcasting. No specification was then available of the standards of performance at which it was desirable to aim in the production of such receivers. Quite recently, however, the Radio Manufacturers Association has published a "Specification for Testing and Expressing Overall Performance of Radio Receivers", and a discussion on this specification was opened by Mr. Stuart Hill at a meeting of the Wireless Section of the Institution of Electrical Engineers held on February 3. The above specification is in two parts, dealing respectively with electrical and acoustic tests. The first part describes laboratory methods of measuring the sensitivity and selectivity of a receiver, and also its susceptibility to noise and the performance of its automatic volume control. The second part describes the corresponding methods of measuring frequency response, acoustic sensitivity, hum and acoustic output. In each case the proposed methods of expressing the results are described and illustrated by means of typical graphs included in the specification.

THE discussion at the Institution indicated that the initiative shown by the R.M.A. in producing this specification is very generally appreciated, although some criticism was offered on matters of technical detail. In so far, however, as Mr. Hill stated, the specification has been drawn up by manufacturers for manufacturers, its useful purpose is somewhat limited at the present time. Furthermore, it does not contain a suggested standard of performance, and this might very usefully be added after consultation with representatives of the users of such receivers and of the B.B.C. and other Government departments interested in the matter. In fact, the time would now seem to be opportune for such a body as the British Standards Institution to take up the subject by setting up a representative committee for the purpose of drafting a specification dealing not only with methods of testing, but also with the standards of performance to be attained by the various types of modern radio receiver. Such a standard specification has long been needed; it would be of great benefit to the radio industry as well as to the general public; and the labours of the drafting committee will now be considerably lightened by the pioneer work already accomplished by the Radio Manufacturers Association.

Standards of Radio Frequency

MODERN electrical measurements are conspicuous for the fact that the frequency of alternating currents can be measured to a very high order of accuracy. In order to provide a standard of frequency for scientific and technical workers, the National Physical Laboratory undertakes the emission of two types of frequency of reference from its own radio transmitting station. One of these is in the form of a modulation frequency of one kilocycle per second superimposed on a carrier wave of 396 kilocycles per second, while the other is a simple carrier wave of frequency 1,780 kilocycles per second. The programme incorporating the first frequency is emitted on the second Tuesday of each month at 10.40-12.00 G.M.T., while the second is emitted on the first Tuesday in March, June, September and December at 21.00-22.00 G.M.T. The modulation frequency employed in the first programme is derived from one or other of two oscillators, which are maintained in continuous operation at the National Physical Laboratory. One of the oscillators is an electrically maintained tuning fork vibrating at its natural frequency of 1 kilocycle per second; while the other is a quartz ring oscillator generating a frequency of 20 kilocycles per second, with the necessary attachment for selecting the required frequency of one twentieth of this value. In both cases, the accuracy with which the frequency is maintained is one or two parts in 10 million, but during each emission the exact frequency is measured at the Laboratory, and the correct value is announced at the end of the programme. For the second standard frequency emission, a separate quartz crystal oscillator is employed; in this case, no correction is announced, the frequency emitted being accurate to within one part in a million. A revised programme giving full

details of these transmissions can be obtained on application to the Director, National Physical Laboratory, Teddington, Middlesex.

Lead Sheaths of Electric Cables

LEAD is a very suitable metal for providing a water-tight covering to an electric cable buried in the earth. The weight of the lead sheaths made per annum in Britain alone is 64,000 tons. Taking into account the much larger quantity that must be used in the many cable factories throughout the world, it will be seen that an improvement in the technique of the manufacture of lead sheaths is one which seriously concerns both users and manufacturers. Of recent years, much thought has been given to this problem and very many patents have been taken out for improvements. In a paper by Dr. P. Dunsheath, read to the Institution of Electrical Engineers on December 3, a method for the continuous extrusion of lead sheaths over cables is described which is being widely adopted by manufacturers. Hitherto, the extrusion of the lead has been done by the ram of a hydraulic press. In Dr. Dunsheath's method, the pressure required to extrude the lead is obtained by means of a motor-driven screw member. In 1929 the first lead pipe was extruded by a continuous process, and the development has continued steadily up to the present. A defect of cable sheaths made on hydraulic presses is the inclusion in the finished pipe of welds between separate faces of metal, which at some stage in the process have been exposed to the air and therefore become slightly oxidized. Provided sufficient time is allowed to elapse and sufficient pressure applied at a sufficiently high temperature, two separate masses of lead will weld together completely into one homogeneous mass if the faces are clean and free from oxide.

Air Raid Precautions and Air Disarmament

A PAMPHLET entitled "Defence that is no Defence", by Dr. C. E. M. Joad, issued by the National Peace Council, directing attention to the inadequacy of the Government proposals for defence against air raids and the impossibility of devising any adequate protection against simultaneous attack by gas, explosive and incendiary bombs, quotes the warning against this barbarous perversion of science and industry in the tendency to accept the use of aircraft for unrestricted bomb and gas attack on civilized populations uttered by leading scientific workers when the Government schemes were first introduced. Subsequent events have only confirmed the prediction that acceptance of this position must rapidly lead to the breakdown of civilized life. Dr. Joad, while emphasizing the futility of the measures so far proposed by the Government and also the difficulty of its position, urges that the Government should work strenuously for abolition of the bombing aeroplane and for disarming in the air and placing civil aviation on an international basis, as affording the only security against destruction of our cities by attack from the air. He also urges a policy directed towards the removal of economic tensions which are

endangering peace, and suggests a definite lead from Great Britain in regard to access to raw materials and equalizing of opportunities for trade which might be provided by an extension of the mandates system, the lowering of tariffs and removal of economic barriers.

Scientific Management and Economic Problems

IN an address to the Engineers' Study Group on Economics on January 19, Major L. R. Urwick spoke on the contribution of scientific management to the solution of present economic difficulties. He outlined the development of the principles of scientific management from the pioneer work of Charles Babbage and F. W. Taylor to such recent manifestations as "Stakhanovism" in Russia. Scientific management means essentially not the multiplication of efficiency experts but the adoption by both employers and employed of a new mental outlook, based on exact measurement and not on opinion, and more interested in increasing the output of industry than in haggling about its division. Resistance to Taylor's ideas had largely been due to those of his followers who had adopted his methods piecemeal while neglecting the underlying philosophy. Scientific management has spread much faster on the productive side of industry than on the distributive, or in finance, and the machinery of Government has also profited far less than it should have from the available knowledge of management problems. The first part of a chapter on "The Division of Labour and the Pricing System" has recently been forwarded in draft, and the chapter on "Money and Banking" has been discussed at a recent meeting of this Group.

Analytical Control of Foods and Drugs

Extracts from the annual report of the Ministry of Health and abstracts of reports of public analysts upon the analytical control of foods and drugs for 1935 have been issued as a separate pamphlet (Sale of Foods and Drugs. H.M. Stationery Office, 1936. 3d. net). No less than 143,831 samples were analysed by public analysts in England and Wales, of which 7,972, or 5.5 per cent, were reported against. The number of samples of milk examined was 78,674, of which 5,798 samples were reported to be adulterated or not up to standard. Several samples of canned products were found to be contaminated with tin, lead, copper or zinc. A few samples of sugar contained sand, and one of icing sugar rancid fat and dead flies. Adverse reports were made on a number of 'cream' cakes and pastries on the ground that the filling consisted wholly or partially of fat other than milk fat, and a number of 'chocolate' rolls and cakes contained no chocolate. The reports of the public analysts are abstracted in a series of tables.

National Institute for Research in Dairying, Reading

IN the annual report for 1935 of this Institute, which has recently been issued, the research and other activities are summarized. The research work includes such varied subjects as winter feeding of young dairy cattle and artificial insemination of