

## Deterioration of Colliery Winding Ropes\*

THE Safety in Mines Research Board has recently issued Paper No. 94 on "The Deterioration of Colliery Winding Ropes in Service", which includes the revision of a former paper, No. 50, of the same title. This is a very valuable production, and should be carefully studied by everybody responsible for colliery winding ropes. The paper gives reports on nearly 250 winding ropes, 85 of which have been broken in service; seeing that the number of fatal accidents in 1933 in shafts was only 28 altogether, of which 16 were due to one accident, the subject may be thought unimportant; but nevertheless it deserves study, because the saving of even one life underground is worth while. The authors, Prof. S. M. Dixon, M. A. Hogan and S. L. Robertson, put down the accidents as mainly due to what they have entitled "corrosion fatigue", which term they use "to describe the phenomenon exhibited by materials subjected to the simultaneous action of corrosion and repeated stressing", and have entirely neglected the possibility of the phenomenon known as "acid brittleness"<sup>1</sup> occurring, although they point out (p. 43) that it is quite possible for these ropes to be attacked by acids, or by salts, etc. The authors refer in passing to the B.S.I. tests and point out that torsion tests, a favourite test in Great Britain, are not used on the Continent.

The causes of accidents are grouped as follows:

(a) Fatigue, unaccompanied by corrosion.

(b) Corrosion-fatigue: (i) unaccompanied by obvious deterioration; (ii) with marked internal corrosion;

\* Mines Department: Safety in Mines Research Board. Paper No. 94: The Deterioration of Colliery Winding Ropes in Service (Including a Revision of Paper No. 50). By S. M. Dixon, M. A. Hogan and S. L. Robertson. Pp. iv+108+8 plates. (London: H.M. Stationery Office, 1936.) 2s. net.

(iii) with marked external corrosion; (iv) with marked internal wear; (v) with marked external wear.

(c) Corrosion, unaccompanied by fatigue: (i) internal; (ii) external.

(d) Wear: (i) abrasive; (ii) plastic.

In Table No. 13, on p. 98, the authors state that they have examined the average life of a number of ropes, of which 51 were broken, and 132 other deteriorated ropes were examined, and that according to them corrosion fatigue accounts for 116 deteriorations out of 183 ropes examined. Altogether it can be said that, whilst deterioration is carefully examined, and instructions are given for finding out the causes of deterioration, omitting of course the cause of the possibility, under certain conditions, of the formation of a brittle alloy of hydrogen and iron<sup>1</sup>, there are but few hints as to the means of avoiding breakages. The authors lay great stress on shock absorbers (pp. 35-38) and also recommend that testing should be carefully carried out, and that ropes which show any sign of wear of either the rope as a whole, or of the wires composing it, should at once be taken off. They also apparently pin their faith on galvanising wires, and pay but little attention to the brittle alloy of zinc and iron which always forms in hot galvanising.

Whilst we have been careful to point out the various directions in which the Safety in Mines Research Board authorities might improve this paper, we nevertheless hold it to be a most valuable one, and one which should be in the hands of everybody in any way responsible for the safety of men in colliery shafts.

<sup>1</sup> V. E. Hillman, *Foundry Trade J.*, 22, 854 (November 1922).

## Crop Plants of the British Empire

THE recent issue of the *Kew Bulletin of Miscellaneous Information* is a compilation dealing with cultivated crop plants of the British Empire and the Anglo-Egyptian Sudan (*Bull. Mis. Information*, Royal Botanic Gdns., Kew. Additional Series, 12. H.M. Stationery Office, 6s. 6d. net). The list has been brought together by Mr. H. C. Sampson, economic botanist at the Royal Botanic Gardens, and is based on information which has been supplied by the Departments of Agriculture concerned. This is the first attempt to furnish information about tropical and subtropical plants, and is a very successful one.

According to Sir Arthur Hill, in a foreword, it is hoped that this brochure will stimulate the trial of new crops. We venture to say that it will without doubt do this, but it will actually have a much wider use even than that. In the study of botany, whether at the elementary stage in schools or at the advanced stage in universities, very little economic botany finds a place, and the practical, everyday application of this important branch of science is almost completely

ignored. Teachers are not solely to blame for this, because most of our important crop plants, including those supplying raw material for foods, beverages, fabrics, etc., are tropical, and therefore most teachers are familiar only with the finished commercial product. There is no good comprehensive book on the subject, but such information as there is, is dotted about in various books, encyclopædias, reports, etc. This brochure now gives teachers and students the essential basis for further information. Nothing of importance need now be missed. Reference to the list will give basic information concerning each crop plant, and then further detailed information can easily be gleaned elsewhere.

The crop plants are listed under their generic names. So many as 450 genera are listed alphabetically. Then under each genus are given various species of economic importance together with their geographical distribution, including, where possible, country of origin, common and vernacular names and other important information. For example,

under the genus *Citrus* are listed eleven species and varieties together with certain 'unspecified' species. Following this list, which occupies 180 pages, are 68 pages of useful crop notes on certain species.

The authorities at the Royal Botanic Gardens, Kew, especially Sir Arthur Hill and Mr. H. C. Sampson, are to be congratulated on this very praiseworthy effort to 'stimulate the trials of new crops, and more especially the trial of other varieties

of crops already under cultivation'. With this aim in view, it will prove indispensable to tropical and subtropical agriculturists; but we feel, apart from this, that if the general subject of botany were taught and studied as it should be, then as a reference list the brochure would be necessary to the equipment of every 'academic' botanist, for as a source of information and guide to further study it will prove invaluable to him.

## Nutrition and National Health

**I**N the Cantor Lectures for 1936 before the Royal Society of Arts\*, Sir Robert McCarrison presented a strong case for the fuller recognition of the importance of nutrition in determining the health and efficiency of human beings, as it has long been recognised in the case of domestic animals. Observations on the dietary habits of different races of men in India have convinced him that the kind of food habitually eaten is responsible not only for striking differences in physique, vitality and endurance, but also for equally striking differences in their susceptibility to diseases of various kinds. His numerous experiments in the laboratory have amply confirmed the field observations and have demonstrated the poor physique and increased liability to disease of animals reared on faulty diets similar in composition to those consumed by large sections of the populations both of India and of Western countries.

The analysis of the dietary factors concerned in the maintenance of good nutrition is proceeding rapidly, and new light is being shed on the origin of a great number of common human diseases and disorders. Insufficient supplies of mineral elements and vitamins have been shown not only to lead directly to the deficiency diseases, but also to be important predisposing causes to other diseases of infective or metabolic origin. Deficiency of one or more of the factors calcium, phosphorus and vitamin

D, which dominate the calcifying processes of the body, is one of the commonest faults in Great Britain. Iron deficiency is responsible for a great deal of ill-health both among infants and among women of the child-bearing period of life. In parts of the world, iodine deficiency is concerned with the appearance of endemic goitre and its associated cretinism and deaf-mutism.

Though but few diseases caused directly by gross deficiency of specific food elements are commonly met with in Western countries, lesser degrees of dietary deficiencies are of great importance in determining the onset of some of the common illnesses of mankind. The geographical distribution of such diseases as tuberculosis, gastric and duodenal ulcer, rheumatism, nephritis and heart-disease in India suggest that nutrition plays an important part in their causation. There is no reason for supposing that nutrition is not an equally important factor in determining the susceptibility of individuals in Western countries to similar diseases.

There is increasing evidence that in Great Britain faulty nutrition is by no means a rarity and is not confined to the poorest classes of society. Two measures are strongly recommended to bring about that raising of the standard of nutrition which should result in a general improvement in physique and a lessening of the amount of disease. The first is the laying of greater emphasis by the medical schools on the instruction of their students in the general principles of nutrition; the second is the teaching of the elements of nutrition to school-children.

\* The Royal Society of Arts. Cantor Lectures, 1936. Nutrition and National Health: Three Lectures delivered before the Royal Society of Arts on February 10th, 17th and 24th, 1936. By Major Gen. Sir Robert McCarrison. Pp. 56. (London: Royal Society of Arts, 1936.) 2s. 6d.

## Measurements of Temperature at Great Heights

**P**ROFESSIONAL Note No. 67 of the Meteorological Office, Air Ministry, by L. H. G. Dines, entitled "The Rates of Ascent and Descent of Free Balloons and the Effects of Radiation on Records of Temperature in the Upper Air", deals with two problems in connexion with the measurement of temperature at great heights in the atmosphere that are more closely related than they appear to be at first sight.

The records of upper air temperature with which the writer is concerned are those obtained at meteorological stations in Great Britain with the aid of the simple mechanism known as the Dines balloon meteorograph, that has been in use with only slight modifications for twenty-seven years.

This apparatus will only indicate air temperature provided that it is not heated directly by solar radiation, or radiation from any other source, and is not chilled by the loss of its own heat by radiation, and, further, provided that the air with which it comes in contact has not been warmed or chilled by contact with any of the auxiliary apparatus—such as the balloon. When an ascent is made during the daytime, the balloon may become strongly heated by the intense solar radiation encountered at very high altitudes above cloud-level, but the meteorograph is suspended 40 metres below the balloon and therefore should not be affected; it is itself shielded from the sun by being mounted inside a polished metal cylinder, open at its ends, the ascent of the