(5) It is recommended that host plants of the corn aphis such as corn, sorghum etc., should not be grown near corn fields. (*Facts about Sugar*. Vol. 27, Number 8. August 1932.)

Green wrapping protects food. Wrapping paper, of a grassy green hue, is superior to transparent wrappers for oil-bearing foods, according to scientists who have recently conducted tests on various wrappers. The green paper, they say, delays development of rancidity by excluding photochemically active light rays. Black paper has about the same effect:—(*Scientific American*, October, 1932).

Molasses valuable as Fertilizer. Intensive experiments are being carried on by the Hawaiian Sugar Planters' Association looking to the disposal of the 250,000 tons of molasses produced annually by the manufacture of Hawaiian raw sugar, says "Food Industries". The market, hitherto enjoyed, for this molasses has largely disappeared, until the industry is faced with the problem of disposing of about 90% of the annual production. It contains on an average about 4·5% of potash and somewhat less than 1% of nitrogen. Its percentage of organic humates is very high. Partly to render the fertilising constituents available but mainly to make a portable mixture of the very heavy, viscous molasses, it is subjected to a charring process with sulphuric acid, followed by the addition of basic crude fertilizers which, together with mill ash, result in the formation of a dry, granular, and readily handled product. Experimental research on the fertiliser has been transferred from the laboratory of chemistry to a plantation factory where, at the present time, several types of mixtures are being prepared on a semi-plantation basis. Soil pot-tests carried out at the experiment station have shown extremely gratifying results. One observation points to the possibility that the undefined humic constituents of molasses give the mixture a value to the plant not to be obtained by the employment of any commercial inorganic fertilizer when used on the same basis of plant food content.—(A. E. B. in *Scientific American*, October 1932).

ABSTRACTS

The Cultivation of Coimbatore Seedling Sugar-canes in South India.—A. C. Edmonds, S. Sitarama Patrudu and M. Ramamurti (*Madras Agri. Dept. Bull. No. 30, 1932.*) The authors attribute the almost stationary area planted under sugar-cane in the Madras Presidency (about 120 000 acres) during the past some decades, and the lack of progress in this direction, to difficulties in regard to water supply. The water requirements for sugar-cane are not definitely known under different soil and climatic conditions, but information obtained at Anakapalli and Samalkotta show that on an average from 4 to 5 acre—9 inches are applied per irrigation, exclusive of losses in irrigation channels, i. e. equivalent to about 100,000 gallons per irrigation per acre. J 247, which is the hardiest of the exotics now being grown, requires the minimum quantity of water, but gives a low yield (about 6,000 to 7,000 lbs. of jaggery per acre) and, except in favourable seasons, a proportion of the canes die. Among the new varieties of thick canes released from the Sugar-cane Breeding Station, Coimbatore, the authors have tried Co. 213 at Anakapalli during the last four years (1927—1931), and the results of a comparative trial between J 247 and Co. 213, which are given in the present Bulletin, show that Co. 213 is a hardier and more resistant variety than J 247 and gives a higher yield of jaggery (about 10,000 lbs. per acre, with a higher percentage of Sucrose (16·02 %), a lower glucose ratio (3·30 %) and a higher coefficient of purity (87·38 %). This new variety tillers well and requires only moderate manuring (1000 lb. of groundnut poonac per acre, provided green manure crops are grown in rotation). The methods of cultivation are described in detail and the authors hope that the introduction of this hardy variety would serve to increase the area planted to sugarcane in this Presidency. (C. N.)

Preliminary Report on the Vitamin content of the Mange.— Edith O. V. Perry and S. S. Zilva (*Bulletin issued by the Empire Marketing Board, March, 1932*). Samples of Indian Mangoes of the "Alphonso", "Cawasji Patel" and "Shendrya" varieties, obtained from India by mail-steamer and preserved at minus 20° C, were analysed in England for A, C and D vitamins. The results showed that: (1) the pulp of the "Alphonso" variety is one of the most potent sources of vitamin C. The "Cawasji Patel" variety is slightly less active, but is as potent as the previously best known natural antiscorbutic source (Lemon or orange juice). The "Shendrya" variety contains in comparison, little vitamin C. One test carried out on the rind of the Alphonso variety showed that it contained at least as much vitamin C as the pulp. (2) The pulp of all the three varieties contains vitamin A in quantities similar to that possessed by butter. The Alphonso variety is somewhat better than the other two varieties in this respect. (3) No very significant amount of vitamin D was found in the pulp of any of the three varieties. (C. N.)

Methods of Hand-milking. A Comparision. K. Boyes and J. Mc Clement. (*Jour. Ministry of Agri., London, vol. 39, pp. 541—544*). As the authors found some difficulty in convincing hand-milkers that contamination may and does follow on the use of wet or greasy hands, they carried out experiments in order to compare three methods of hand-milking, viz. (1) milking with clean, dry hands, (2) with clean, wet hands, and (3) with clean, dry hands lubricated with vaseline. The "dry-handed" milkers washed their hands thoroughly in soap and water and dried them on a clean towel before starting to milk. The "Wet-handed" milkers washed and dried their hands, but moistened them with milk before and during the progress of milking; while those milking with greasy hands, washed and dried their hands, but rubbed them with a small portion of clean vaseline before starting to milk. Precautions were taken by change of milkers, time and place and by use of sterile vessels and packing in ice, etc., to exclude as far as possible all sources of contamination likely to cause variation in the bacteriological content of milk, other than that arising from the condition of the milker's hands. The samples were analysed for bacterial count and for the presence of B. Coli. Out of 30 samples of "dry-handed" milk, none showed the presence of B. Coli, while for an equal number of "wet-handed" and "greasy-handed" samples, there were 15 and 16 samples respectively which showed the presence of the Bacillus. Out of 30 samples of each of the three classes, 22 samples of "dry-handed" showed bacterial counts less than 1000 per c. c. of milk, while 16 samples of the "wet-handed" and 10 samples of the "greasy-handed" showed counts up to 10,000 per c. c. of milk. The "dry handed" milk showed the least contamination with loose hair. The results demonstrate that milk drawn with clean, dry hands, is cleaner than milk drawn by wet or greasy hands. (C. N.)

Annual Report of the Indian Central Cotton Committee for the year ending 31st August 1931. (Indian Central Cotton Committee Bombay, 1932). This Report reviews the activities sponsored by the Indian Central Cotton Committee in connection with the Technological Laboratory at Bombay, the Indore Institute of Plant Industry and the various provincial centres of activity organised in cooperation with the Provincial Departments of Agriculture. Progress in the introduction of improved varieties of cotton is followed and statistics given regarding the production and consumption of different varieties of cotton in the various provinces of India. Tests made in the Technological Laboratory at Bombay with 5 samples of *Karunganni* containing from 16% to 31% of low quality cotton known as *Pulichai*, show that on the average, the mixture was suitable for 12's only, while the average over seven seasons for pure *Karunganni* was 24's; the authors of the Report infer from this, the urgent necessity for stamping out the cultivation of *Pulichai*, which is grown in the Tinnevelly District as an

adulterant. Preliminary trials with 289 F cotton showed that it was fit for 60's and 80's yarns when it is combed to the extent of 20 to 30%, showing that the finer counts of yarn could be produced in India itself. A brief account is given of the various Research schemes in progress in the different provinces, which are financed by the Committee. In the Madras Presidency, three schemes are financed by the Committee, viz., (1). The Madras Herbaceum Scheme, commenced in 1923 in the hope of obtaining an *Uppam* strain of cotton which will spin and yield as well as *Karunganni*. (2). The Fodder Cholam Scheme, mainly intended to examine the causes for the poor yield of cotton when grown in rotation with foddor Cholam (Andropogon Sorghum), a phenomenon which does not occur when "cumbu" (Pennisetum typhoideum) is the alternative crop. (3). The Pempheres and Physiological Scheme, which consists of an investigation into the methods of combating the Cotton Stem Borer (Pempheres affinis) which is a major pest in Madras and some other parts of India. Two officers of the Madras Agricultural Department have been sent for training in this connection to England. The Committee is financing in all 33 schemes at an estimated cost of Rs. 6,83,843 per annum. Total receipts of the Committee for the year under review amounted to Rs. 9,05,804 and expenditure Rs. 7,35,412, against an estimated expenditure of Rs. 9,70,677. (C. N.)

Lucerne cut at various stages of growth :— E. Griffith and A. A. Ramsay (Agri. Gaz. New South Wales, 1932, vol. 43, pp. 657–665).—The authors have examined the variation in yield and composition of lucerne cut at different stages of growth, viz. (a) when about 6 inches high, (b) in the "bud" stage, and (c) in "full flower". Their results show :— (1). Protein content is highest in lucerne cut when 6 inches high (25.96%), is very slightly less (25.65%) in bud stage, and markedly less (19.37%) in lucerne cut when in full flower. (2). Fibre content is lowest in lucerne cut when 6 inches high (13.91%), and rises steadily to 14.77% at the bud stage and to 19.59% at the full flower stage. (3). The ash content is highest at the "6 inch" stage (14.82%) and falls continuously to 13.34% at the bud stage and to 12.36% at the flower stage. (4). The "nutritive value" of each 100 lb. dry matter in lucerne cut when 6 inches high (76.12) closely approximates that of lucerne cut at the "bud" stage (75.99) while it is 4.3% lower at the "full flower" stage (72.85%). The albuminoid ratio is approximately the same at the 6 inch stage (1:1.93) and the "bud" stage (1:1.96), while it is wider at the "full flower" stage (1:2.75). (5). Lucerne cut when 6 inches high yielded 3,043 lb. per acre dry matter with an albuminoid ratio of 1 to 1.83. When cut at the "bud" stage, 4,164 lb. dry matter was obtained (an increase of 36.8%), having an albuminoid ratio of 1 to 1.93. When cut in full flower, 4872 lb. dry matter was obtained (being an increase of 60.3% compared with lucerne cut at the 6 inch stage), and the albuminoid ratio was 1 to 2.62. (6). Approximately one third more stock (36%. could be fed on lucerne cut in the "bud" stage than if cut when 6 inches high). The albuminoid ratios of both lucernes would be practically the same. The lucerne cut when in full flower, would feed 60% more stock than if cut when 6 inches high, but the albuminoid ratio of this lucerne would be slightly wider, viz. 1:2.62. (C. N.)

Report on the Marketing of Honey and Bees-wax:— (Ministry of Agri. and Fisheries, England, London, 1931). This interesting pamphlet gives the results of a detailed investigation of the marketing of honey in England, Wales and Ireland. Part I deals with the general aspects of the collection and storage of honey, including the composition and properties of different kinds of honey, and also examines the question of the internal supplies and demand within the country. In 1929, there were about 56 active associations of Bee-keepers in England and Wales, with a total membership of about 13,500. There were about 100,000 colonies of bees, each colony yielding on the average from 30 to 40 lb. of

honey per year. The total output of honey in England and Wales in 1929, was estimated at about 34,300 cwt., valued at about £200,000. Besides internal production, Great Britain imported about 100,000 cwt. of honey, chiefly from New Zealand, Australia and America. The wholesale price of imported honey was about 50 sh. per cwt. and that of home-produced honey about 100 sh. per cwt. The retail price varied from 1 sh. 9 d. per lb. for home-made to about 1 sh. for Canadian honey. Part II of the Report deals with the important question of preparation of honey for the market, e. g. the problem of quality, processing, grading and packing, while Parts III and IV deal with methods of organization among Bee-keepers, for co-operative sale and distribution, as practised in other countries like New Zealand, Australia and America. The closing parts deal with the question of transport and storage and also with methods for utilization of Bees-wax. In the concluding remarks, the authors observe that out of the present consumption of honey in England amounting to about ¼ lb. per head of population, only about 1 oz. per head is produced within the country itself, and that there is great scope for expansion in home-production, for which purpose they recommend the formation of effective Marketing Boards similar to those organized in New Zealand and Australia. (C. N.)

Social Consequences of Scientific Discovery. The concern for the social consequences of the application of scientific discoveries which has been voiced by Dr L P. Jacks in a series of recent articles was reflected in several of the addresses and discussions at the recent British Association meetings. Dr. Jacks suggests that instead of lending itself to the creation of endless desires, science might regard its task of giving man control over the forces of Nature as sufficiently advanced for the time being and turn its attention to the equally important task of assisting man to control himself. Recognition of this necessity was as explicit in Sir Alfred Ewing's presidential address before the British Association as in the forceful address delivered by Prof. Miles Walker to Section G (Engineering), which referred frankly to the hampering of developments by vested interests and the middleman, as well as to the value of the contribution to the improvement of the lot of mankind made by those who possess the power of devoting their whole energy to the execution of sound, practical, and beneficient projects for the sake of those projects themselves and not primarily from selfish motives or in pursuance of some irrational prejudice. Long after science has shown the way to make things better for the people, unintelligent control and stupid prejudice preserve the old evils and prevent the spread of better ways. If effective action is to be taken, now that in so many fields physical science has instructed man how to control and eliminate waste, the human sciences must show him how to control the waste forces of his own nature.

As an example of the potentialities, Dr. Jacks and Prof. Miles Walker both refer to Lord Baden-Powell's discovery of how the play-hunger of the young human animal, his love of adventure and fun, his sporting instincts, and even his devilries, can be used by skilful hands for the development of self-control, self-respect, courage, loyalty, discipline, good fellowship, responsibility and competence. This is a great discovery, to be ranked with any of the achievements of physical science, and is a token of what may be possible when we really address ourselves to the development of social sciences. The picture Prof. Miles Walker draws of the State as controlled by the engineer, with the elimination of waste at its source, the control of production, improvement of distribution so as to secure the manufacture of things men want and their distribution in the simplest way with the minimum addition to the cost, involves drastic curtailment of competition and perhaps a profound change in our social habits and attitude towards buying and selling. In insisting on technical knowledge and administrative

ability as a qualification for public office, he is, however, expounding a doctrine freely voiced in NATURE for many years, and the proposed experiment of a small, relatively self-supporting community is one that should not be without appeal to scientific workers. The time is opportune for courageous and adventurous experiment. The world has yet to receive an object-lesson in the high standard of life which should be possible by good organisation and modern methods, where prejudice and incompetence are no longer allowed to deny to society the benefits of leisure or material possessions with which the application of scientific discoveries would endow them.

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Reviews.

The Technique of Field Experiments.— (Rothamsted Experimental Station, Harpenden, England, 1931, 64 pp., 1 sh. 6 d. net). This pamphlet contains a collection of papers read at a conference held at Rothamsted in May 1931, to discuss methods for the incorporation of statistical principles into the conduct of Field Experiments, and opens with a Foreword by Sir John Russell, wherein he traces the historical development of statistics as applied to agricultural experiments, with special reference to the introduction of methods like Beaven's half-drill strip arrangement, the Randomised Blocks and the Latin Square. Fisher's contribution towards the perfection of the mathematical technique is emphasised. With the improved methods of plot arrangement and cultural practices now in use, it is found that the standard error per plot at Rothamsted ranges from about 8 to 10% for Randomised Blocks, and from 4 to 8% for the Latin Square arrangement. Heavier crops like potatoes or Beet-root, give lower values for standard error. As there are usually several plots of each treatment, the standard error of the final result is much less than the figures of errors per plot; it is usually now at Rothamsted about 2 to 4 % of the mean yield.

Among the interesting papers included in the present publication, those of Dr. Fisher on the principles of plot experimentation in relation to the statistical interpretation of the results, of Dr. Wishart on the methods of field experimentation and statistical analysis of the results, of S. F. Armstrong on the technique of variety trials, and of H. V. Garner on the practical details of experimentation on ordinary commercial farms, deserve special mention. Dr. Wishart clearly explains with illustrations, the detailed working out of results in the case of Randomised Blocks and the Latin Square method. The practical details of the application of Beaven's half-drill strip method to varietal trials, as developed by the National Institute of Agricultural Botany, England, are dealt with in Armstrong's paper. The growing importance attached to the statistical analysis of agricultural experiments of all kinds, and the extension of statistical methods to new fields where special difficulties arise due to the wide heterogeneity of the populations under study and the present imperfection of technique both in regard to cultural practices and suitable modifications of statistical treatment, is shown by the contributions of Prof. Stapledon, who deals with the technique of grassland experiments, of Hoblyn who expounds the technique of horticultural experiments, and of Lewis *et al* who deal with Multiple-schemes of field experiments. On the whole, the pamphlet offers a refreshing series of glimpses into the different aspects of statistics in relation to agriculture, and is worth a perusal by all those interested in the conduct of field experiments. (C. N.)

Coir or Cocoanut Fibre.—A Report on its extraction and properties—S. G. Barker (Wool Industries Research Association, London, 1932.) As Fowler and