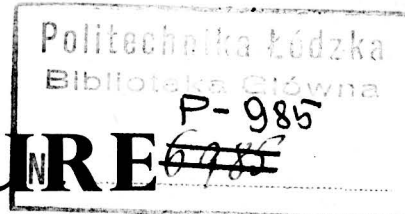


FOOD MANUFACTURE



Vol. XVIII, No. 2

February 1, 1943

Ships, Bread and Potatoes

THE URGENT necessity for stirring the imagination of the people and the bakery and catering trades in the matter of saving shipping used in bringing wheat to this country by the increased use of potatoes was Lord Woolton's text at his Press Conference of January 12. He said that half the British seamen are engaged in bringing food to this country and that half the food is wheat.

Lord Woolton made a threefold appeal: one to the British housewife and the caterers, one to the bakery trade, and one to the Trade and National Press.

The first appeal to use more potatoes in place of bread has already been in operation for a considerable time through the medium of the National Press. There are doubtless delicious dishes to be made from potatoes, as Lord Woolton declares, and the best potato dishes of other countries have been published. That such propaganda has fallen on stony ground as far as the catering trade is concerned was made clear by Lord Woolton himself when he complained that "it is rarely that I have myself been offered a dish consisting primarily of potatoes".

Lord Woolton, in passing, touched upon the use of potatoes in bread, mentioning the experiments which have been or are being made under the auspices of the Ministry. It is presumed that when the time comes there will be no appeal against having potatoes in bread, it will simply be put in. And a lot of people will grumble, just as they grumbled about the National bread, and they will get used to it and may get to like it.

A second appeal was to the bakery trade. It took a more specialised and intensive form than all previous ones. An adjunct to the conference was an exhibition of no less than seventy-five varieties of flour confectionery containing anything between 5 and 30 per cent. of potato. It is projected to arrange for instruction for bakers in using potatoes, and to give them the advantage of an even wider range of confectionery lines than hitherto and at the same time save flour. To this end, voluntary lecturers are to be sent out to instruct their colleagues in the trade in the whole business—type of potatoes to be used, methods of preparation and full details of twenty-four recipes. These courses will be continued until everybody engaged in flour confectionery has received instruction.

This is an extensive scheme, devised to save the wheat hitherto entering into the composition of the flour confectionery normally being made—doubtless a large amount.

Lord Woolton's third appeal was to the National and Trade Press to publicise these matters. The former has already done so, mainly from the angle of possible bread rationing.

The Trade Press will doubtless respond, as in the past it has done. Incidentally, FOOD MANUFACTURE anticipated matters last September by publishing an article on the uses of potato flour, and in the present issue the subject is again discussed and recipes given.

The result of the new drive so far as flour confectionery is concerned, and which apparently is receiving the support of the bakery industry, should be a significant saving of flour; otherwise the scheme would not have been launched. Should these results be inadequate, Lord Woolton has two shots in his locker, the mixing of potato flour in bread or the rationing of bread, or both.

As the appeal method has not been entirely successful, to say the least, rationing is the more likely alternative. The plan for this is ready-made and its application should not be difficult. As Professor Marrack declares in his book, *Food and Planning*, "If people are convinced of the need, and believe they are treated fairly, they will put up with greater hardships than they have ever dreamt of so far."

Soils, Food and Teeth

At the 1941 meeting of the American Dental Association in Houston, Texas, Dr. Edward Taylor called attention to the tooth-decayless paradise that bears the quaint name of Deaf Smith County, Texas. Dr. Taylor found that the soils of this county are unusually rich in fluorine, phosphorus, calcium and vitamin D—or so the editor of *Soil Conservation* says in his leader on clinical tests applied to soil. These riches presumably account for the almost total absence of cavities, toothaches, fillings and dental bridgework in that county. Wheat ground in the local mills is high in protein and contains about six times the normal quota of phosphorus, while milk (it is said) has thirty times the phosphorus ordinarily expected. The well water is especially abundant in calcium.

Meat and Fish Pastes

Has the public taste for meat and fish pastes been adversely affected by the wartime regulations imposed by the Ministry of Food on the use of ingredients in these products? The question is raised by a large manufacturer who recently declared that, in spite of the rationing of jam, marmalade and other "sweet spreads", he is now selling only a small percentage of his normal output of meat and fish pastes, and as the demand for these products has fallen considerably during the past twelve months he believes that the cause must be that manufacturers' present-day formulæ are not pleasing to the public palate. He suggests, therefore, that the Ministry of Food should show a little more leniency towards the industry in the allocation of ingredients.

The manufacturers' case was put before the Ministry and their views asked for. The reply was that the total consumption of meat and fish pastes throughout the country had shown no diminution during the past year and that there was, in fact, a definite shortage in some districts. The Ministry was therefore switching supplies from one area to another, so the original complainant might very soon be supplying different markets.

It is realised, of course, that the public taste for these pastes varies widely in different districts. Working-class areas often prefer "strong" flavours, such as bloater and anchovy, whereas the more delicate flavours find more ready markets in better-class neighbourhoods. It is more difficult to satisfy local whims of the public palate in wartime, and consequently local irregularities in demand may be expected.

Vitamins and Capacity for Work

In calling attention to the fact that scientific evidence on the relation of vitamins to efficiency of body and mind, the *B.M.J.* (October 24, 1942) cites some interesting papers on the subject which have recently been published.

Keys and Henschel (*J. Nutr.*, 1942; 23, 259) studied, in the course of ten months, physiological and biochemical responses to severe exercise of 26 soldiers receiving the standard U.S. Army post rations. The Army ration itself supplied on the average 1.7 mg. of vitamin B₁, 2.4 mg. of riboflavin and 70 mg of ascorbic acid.

The daily vitamin additions varied from series to series and consisted of 5 to 17 mg. of vitamin B₁, 100 mg. of nicotinic acid amide, 20 mg. of calcium pantothenate, 10 mg. of riboflavin, 10 mg. of vitamin B₆ and 100 to 200 mg. of ascorbic acid.

No evidence whatever was found of any effects of the vitamin additions on muscular ability, endurance, resistance to fatigue or recovery from exertion. Keys and Henschel concluded that no

useful purpose would be served by enrichment of present U.S. Army garrison rations with the vitamins studied.

Another group of American workers (Simonson and co-workers, *J. Industr. Hyg.*, 1942, 24, 83), while accepting the correctness of Keys and Henschel's findings, have expressed doubts whether these negative findings may be generalised—first, because they dealt with only one type of work, and, secondly, because functions of the central nervous system had not been studied. The results of experiments show, in the opinion of the authors, that additional vitamin B would benefit the working capacity in the manifold occupations where fatigue is primarily due to fatigue of the central nervous system. It is not known which factor of the vitamin B complex was primarily involved, but work done at the Mayo Clinic underlines the importance of vitamin B₁ (Williams and Mason, *Proc. Mayo Clin.*, 1941, 16, 488).

The article stresses that for heavy manual labour, long hours of work and the nervous strain of war, the vitamin B₁ intake in this country may not be optimal, and the effects of rationing of meat and milk on riboflavin and nicotinic acid in our diet must be carefully watched. It is gratifying to learn that the necessary scientific investigations are taking shape.

Estimation of added Chalk in Flour

At a recent meeting of the Society of Public Analysts a paper on the "Estimation of Added Calcium Carbonate in National Flour" was presented by E. N. Greer, J. D. Mounfield, and W. J. S. Pringle.

Three methods were studied and are described: (a) The sample is incinerated and calcium is determined in the ash by precipitation as oxalate and titration with permanganate; a blank estimation should be made on a sample of the same flour without added chalk. (b) The sample is treated with excess of standard hydrochloric acid and the excess titrated back with alkali; with this method also a blank estimation is necessary. (c) The carbon dioxide liberated by excess of hydrochloric acid is absorbed and weighed.

If a control sample of the unfortified flour is available the oxalate method is the most accurate; without a control sample the error may be as much as 20 per cent. Method (b) also requires a control sample and when the amount of chalk is about 7 ozs. per sack the method is accurate to 3-4 per cent. Method (c) is accurate to within about 3 per cent., even in absence of a control, and this method is therefore the most useful of the three.

The oxalate method measures calcium in any form, whereas the other two methods only estimate calcium in the form of carbonate. In practice, however, approximately 99 per cent. of the calcium in *creta præparata* is in the form of carbonate.

Vitamin A in Fish Liver Oils

Another interesting paper was presented at the meeting mentioned above by J. I. M. Jones and R. T. M. Haines, and was concerned with the "Spectrophotometric Estimation of Vitamin A in Fish Liver Oils".

The spectrophotometric estimation of vitamin A in low-potency fish liver oils is usually carried out on the extracted unsaponifiable matter, in order to get rid of irrelevant absorption at the characteristic wave-length of 325 m μ . It has previously been stated that no direct relation exists between the absorption so determined and that determined on the whole oil. A re-examination of the matter, however, shows that there is a strong correlation between the two values for the same type of oil and that the difference is probably not due to irrelevant matter unless it be that such matter is always present in fixed relation to the vitamin A. Data for cod, shark, halibut and tunny liver oils show this correlation, but the nature of the correlation in cod and halibut is different from that in shark and tunny. There is evidence that the cause of the loss of absorption after saponification is not affected by wide variations in technique, but is related to the nature of the oil and may be connected with adsorption of vitamin by the soap formed during saponification.

Concentration of Creameries

The Ministry of Food, as foreshadowed in these notes, has begun a further concentration of the country's creameries and has also extended the process to milk depôts. A number of establishments in both categories have been served with closure notices on the ground of redundancy, and action in this direction is continuing.

The object of the new concentration is to effect still further economy in milk distribution. Supplies of milk that formerly passed through certain depôts en route to the liquid market are now being sent direct from the farms to retail distributors and the depôts are being closed. Action along these lines has been taken in several cases, and economy in transport has resulted.

In some instances, however, the Ministry considers it inadvisable to close milk depôts, although economy in transport would thereby be effected. It is essential that the Ministry should have control over bulk supplies of milk either for carrying out, when necessary, movements of large supplies for the liquid market or for manufacturing purposes.

During the 1942 manufacturing season, 126 creameries, the majority of them cheese factories, were idle. The Ministry is now closing a number of additional cheese factories, particularly in Lancashire. The creameries and milk depôts to be retained in service are being selected by reason of their geographical position, local conditions of

supply, and the requirements of the liquid and manufacturing markets.

The Ministry is satisfied that considerable further economy in milk depôt expenses can be effected without impairing the efficiency of milk distribution, and an official hint has been given that depôt proprietors might establish a fund out of which owners of redundant premises and those which handle greatly reduced supplies of milk might be compensated.

Concentration both of manufacture and wholesale distribution is closely linked with the problem of transport. Trade unions concerned have suggested to the employers' organisations that the recent agreement under which the Essential Work (General Provisions) Order is applied to the milk manufacturing and distributive industries should be extended so as to cover milk transport workers.

Silver-Lined Cans

Sundry references have been made from time to time recently to the use of silver to replace tin as a lining for food cans. Some interesting data on the subject are given in an article in *The Canner*, September 12. The article declares that the work of silver-lined containers is now ready to be carried forward by industry in the plant, on pilot and full-scale operation. The suitability of silver for the lining of food cans is demonstrated, and the importance of its intrinsic sentimental sales appeal suggested.

Silver can be applied economically to metal containers by electro-deposition on the sheet, which can then be formed and soldered. It can be applied from the very thinnest deposits (0.001 inch) up to very heavy thickness (0.05 inch) with equal facility. It has also been deposited, under laboratory conditions, at very high current densities up to 200 amperes per square foot, thus pointing the way to reductions in the time of "dwell" in the electro-plating bath to a fraction of common practice.

The cost of silver-plating depends on a number of different factors, among which figure the finish desired, the volume of output, and the weight of silver deposited. For a deposit of 0.001 inch thickness the figure of 28 cents per square foot is given. The work of the Silver Producers' Research Project has indicated among other things that:

1. Pore-free deposits of silver 0.001 inch on deep drawing steel are readily obtainable.
2. Silver-plated steel and objects fabricated from it may be joined or assembled by the use of low temperature silver brazing alloys and induction heating without recourse to a protective atmosphere.

Silver-lined containers are now being considered seriously in the U.S.A. for such products as food-stuffs, high-grade beverages, beer, cola syrup concentrates, and condensed and evaporated milk.

The Principles of Canteen Inspection

When a community makes itself responsible for supplying some, at least, of the basic needs of its members, it may be assumed that the principle of *guarantee* will sooner or later be evoked. The growth of the canteen system is encouraged by the Ministries and might be said to involve the community in a certain measure of responsibility for the nutritional state of the population. This article is concerned with a few of the problems raised by this possible development.

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THE SCOPE of canteen inspection may be defined by means of a conjectural figure or two. For example, in October of last year there were almost a million school-children being provided with a canteen meal on each school day. In this instance the approximate amounts of certain constituents have been recommended by the Board of Education. According to the Board (Circular 1571, November, 1941), each meal should supply about 25 gms. of animal protein and about 30 gms. of fat. This is approximately half a child's daily requirements; and it may be assumed that the intention is to provide in the meal at least half the desirable intake of some of the more important vitamins and mineral salts. The proportion of the daily Calories supplied is comparatively unimportant. If we estimate in terms of certain essentials of the dietary, then the community will soon be making itself responsible for half the nutritional well-being of about a million children; or, as expressed in population figures, for the full nutritional well-being of 0.50 million children.

Factory Canteens

The weekly number of meals supplied in factory canteens of the A. category—i.e., those allocated a double meat ration—is probably about 17 million. Allowing for a proportion of breakfasts and snack meals and adjusting the figures for different days of the week, we can suppose that about 2.5 million meals are thus consumed each weekday; and here again the meal should be calculated as supplying approximately half the daily requirements in several of the main constituents of the diet. The full social responsibility on this basis covers about 1.25 million of industrial workers. The weekly number of meals served in the non-priority works canteens is now probably of the order of 30 million. This might allow 4 million meals each weekday; and, since in this instance the allocations are lower in some respects, we may suppose that not more than a third of the daily intake is thus assured. In terms of total nutritional needs, this gives an equivalent of 1.3 million consumers. Consumers in the municipal restaurants have approximately the same allocation as those in the non-priority works canteens, and since they still number less than 400,000 on any average weekday, the full social responsibility does not here reach beyond a figure of some 0.13 million.

The significance of these official figures may not be quite clear, but it is evident that the central and local authorities are now approaching the stage where they assume some measure of responsibility for the nutrition

of the public. Expressed in population figures, the proportion of the daily intake would approximate to one of 3.2 million persons, and this must be slightly below 8 per cent. of the civilian population of the country. It has never been quite obvious how far a guarantee of the nutritional adequacy of meals is involved. Prior to the war the problem arose only in regard to school-children; and it was taken for granted by the Board of Education that school medical officers might exercise some definite supervision. The position in regard to factory and municipal canteens has not been precisely defined.

Duties of School Medical Officers

In his annual report on "The Health of the School Child", the Board's Chief Medical Officer, has from time to time outlined what he considers to be the duties of school medical officers. Thus, in his report for 1927 he recommended that the "constitution and service" of the school meal be "under effective supervision and approved by the school medical officer". In 1931 he went further to state what proportion of the child's daily intake should, in his opinion, be supplied by the midday meal; and he added that "it becomes the duty of those responsible to assess the value of every dietary on the principles enunciated above and to revise and supervise it according to these principles". The 1932 report cites among other duties that might suitably devolve upon the medical officer and his assistants, the approval of the dietary and the proffering of advice on "the quality, quantity, cooking and service of the food".

The extent to which medical officers undertake these functions depended, and still depends, upon the time at their disposal and upon the instructions given them by the authorities they serve. While the Board has occasionally indicated the standard that meals should reach, it has not verbally insisted that meals shall reach this standard. Since, however, the provision of meals has for many years ranked for grant, it is presumably competent for an inspector to examine the dinners provided and to report accordingly. In practice this rarely happens; the staff of specialised canteen inspectors now employed by the Board has its time too fully occupied with general instruction and advice; and, in effect, no central inspection of the nutrition of school-children has been instituted. The local medical officers vary extremely in the degree of time and attention they devote to the service, and it is doubtful whether any of them have initiated a sampling method.

Control of School Meals

No fresh powers would have, however, to be acquired by the Board to enable it to devise its own sampling system in the matter of school meals. On the other hand, it is probable that no one outside the Board possesses the necessary powers of inspection. In virtue of its wartime functions, the Ministry of Food could presumably claim the right of entry to all premises registered as catering establishments to assure itself that the food is being properly apportioned to the consumers; so far it has made no such claim from a purely nutritional standpoint. Its representatives—and, as far as factory canteens are concerned, the representatives of the Ministry of Labour—have certain powers of entry and supervision; these powers are mainly exercised in regard to the use, misuse and misappropriation of rationed foods, and beyond that they are, in practice, usually limited to the proffering of advice and information.

The municipal canteens are directed in great part by the appropriate local authorities; and it is, of course, competent to these to instruct their medical officers to visit the restaurants, sample the meals and report on the quality of the dietary. But the fact is that such supervision is at present rarely exercised, though a number of medical officers may cursorily examine the menus submitted to them. There appears to be a general unwillingness on the part of the local medical service to undertake with a depleted staff a further duty that may often seem to have but a formal value.

Municipal Canteens

The truth is that, while the guarantee to children of an adequate dietary has for some time been recognised as a proper principle of government, adults rarely obtain from the State any guarantee of a *positive* nature unless they evidently insist upon it. The provisions of the Food and Drugs Act were not formed with this object in view. It is probable that, if the practice of fortifying or enriching certain foods with vitamin and mineral preparations survives the war, the Act will have to be amended and so acquire certain wider characteristics. But there is at the moment no need for this, since the Minister of Food possesses all the powers he may require. The question whether the public would prefer to have the dietary in its factory and municipal canteens regularly subject to inspection is a delicate one, and it is not worth our while to examine it for more than a paragraph or so.

Administration Problems

It seems usually to be maintained that a man wishes his Government to save his food from adulteration, but that he prefers to be free to acquire a mild vitamin deficiency if his choice of diet makes it inevitable. This will not necessarily remain true of the consuming public. Most people can judge the taste and the quantitative sufficiency of a meal, but they cannot pass judgment and they do not want to be burdened with the responsibility of passing judgment on its dietetic value. It might be argued that a community should safeguard the dietetic welfare of its industrial workers in time of war; but even if this were desirable there is a lack of trained personnel, and the general view of the Ministries concerned is that the employees know "what they are entitled to" and have their own methods of seeing that

they get it. This may or may not be the whole truth. But when the wartime powers of the Ministries lapse after the close of hostilities, there will certainly have to be fresh legislation before any kind of nutritional inspectorate can be established. Such legislation could scarcely come about without a public demand for it, expressed, as these demands usually are, through the press and the platform.

A demand of this nature might well arise; and, if it does, the administrative problems of a nutritional inspectorate would become interesting.

Standards of Diet

No standards of diet and of palatability have, as far as can be ascertained, been applied to the service in factory canteens. Yet the regulation imposing on many factories the duty of providing a canteen is presumably based on the considerations that (1) a diet insufficient in quantity and quality will lower the rate of production, (2) many factories, docks and mines are to-day so sited that the workers cannot readily reach their homes at midday, and (3) an element of comfort and quiet contributes to the *morale* of the employees. These motives would certainly seem to involve the principle of guarantee, and the principle of guarantee involves the establishment of standards and the right of inspection. Moreover, a fair percentage of the employees in many large factories are young people of 14 to 25 years, and there seems no adequate reason why the Chief Medical Officer of the Board of Education should lay down standards to be observed in the school canteens, while the medical advisers of the Ministry of Labour omit to apply similar standards to the dietary of young persons who happen to have passed from the school to the factory.

If it is argued that there is a shortage of trained personnel for a wholetime inspectorate of the size required, one may suggest that the personnel could be supplied by teams of research workers operating under a voluntary scheme. There are at present some hundreds of analytical chemists dispersed over the country in research laboratories, and experience shows that many of them are quite prepared to volunteer for inspection of local school or municipal canteens. But, as for as one is aware, in few cases only have they obtained right of entry to the factory canteens, where the bulk of the communal meals are served and where the need of inspection is obviously greatest.

Three Forms of Inspection

In any form of inspection there are at least three factors to be considered: (1) The method of sampling among a given number of canteens dispersed over an area, (2) the method of sampling the dishes served, and (3) the minimum tests required in a routine examination of the dietary.

(1) *Method of sampling in an area.* The area of a small county authority might already include 100 school canteens, 20 municipal canteens and 50 factory canteens of varying capacity. It is scarcely feasible for an inspector to visit more than one canteen in a day, since the dishes must be sampled as served. It is therefore desirable to make a rough preliminary classification of canteens in consultation with the authority's canteen organiser, who usually has a shrewd idea of

their graded adequacy. Information on the conditions of service in factory or dock canteens cannot be so readily accepted. Observations may be made by the officers of the Food or Labour Ministries, but such officers have rarely had the necessary training in dietetics, and they are concerned with many matters beyond the character of the actual meals provided. Complaints, however, are not uncommon from the employees, and it seems probably that, if there were a corps of trained voluntary investigators, complaints of this kind could be submitted formally to them; this would, at all events, help them to make a rough classification of canteens in any given area.

Some principle of sampling would, however, have to be observed. From the investigator's point of view, the canteens of all kinds would have to be divided into categories according to some system—e.g., (a) canteens where it is suspected that the diet is insufficiently balanced; (b) canteens where the mode of storage, preparation and cooking are believed to be destructive of food values; (c) canteens stated to be serving food in unpalatable form; and so on. This would make it possible to take adequate samples of each category. But the fact is that we know too little as yet about the effects on food of the various methods of large-scale food preparation, and only as research brings more exact knowledge shall we be in a position to refine our system of inspection.

(2) *Methods of sampling the dishes served.* Any visit to a canteen must presumably possess the element of surprise. In a well-run canteen the investigator has at least three sources of information: (a) the cook's day-book showing the quantities of food used and the menus, (b) the canteen day-book showing the numbers dining, and (c) the actual dishes served over the hatch or table to the diners.

(a) Quantities of foodstuffs can be roughly calculated on a few selected days for the number of meals served. It is here not uncommon, especially in municipal canteens, to find that the amounts of various foodstuffs recorded for the main dishes on the menu are less than the number of diners might have led one to expect, though they may at times be more. Either the cook has had to make up an extra dish from other available supplies to meet the unexpected demand, or else, as occasionally happens, the portions served are on an average smaller than they should have been. Servers are sometimes infected with a desire for strict parsimony, and there may be a considerable fall in the Calorie content of the meal and not in that alone. The tendency has to be watched.

(b) Variation in the number of diners from day to day depends on several factors. There seems to be little variation in the school canteens during the normal school periods, but a variation in the numbers attending factory canteens may occasionally depend upon the character of the menu; if they occur, they are worth observing, as possibly indicating that a particular dish is disliked for some reason. Municipal canteens may be subject to wider variation in custom. There is usually, it seems, a perceptible fall on Monday when meat is still available in the home for sandwiches and so forth; there is a steep drop on Saturday and in some areas a tendency for early closing day to be reflected in a slight fall in numbers. In two municipal canteens, where the experience seemed to be normal, the average attendance over a period of some months was as follows:

AVERAGE DINERS AT TWO MUNICIPAL CANTEENS.

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Canteen A.						
Feb.-May, 1942	328	385	384	373	394	175
Canteen B.						
Jan.-May, 1942	110	127	125	137	129	44

The averages for the four middle days of the week were 384 and 129 respectively. There had thus been a considerable drop on the Mondays.

(c) Meals may be served in a canteen over a period of two hours. It seems advisable to take three or four sample dishes at considerable intervals. The investigator would have to relate the analysis of the dishes to information on the actual practice of the kitchen in regard to storage, times of preparation, methods of heating, period of keeping hot and, if meals are carried in containers, methods of packing and conveyance.

(3) *Minimum tests required.* The art of inspection lies in the gradual refinement of method, so that from a few selected factors the condition of a whole establishment or service can be accurately judged. The question is, What are the criteria of a canteen meal? Certain constituents of the diet can be dismissed. It may be assumed that the public must obtain the greater part of its intake of the vitamin B group from its bread and other flour products; flour is certain to be used in the preparation of most canteen meals; it is perhaps advisable that bread should be provided liberally at works canteens, but this would only apply when the shipping position permits. If the allocations of milk, butter and margarine are evenly utilised in the cooking, the diners will have all the vitamin D that is available to them from this portion of their daily meals. The main sources of calcium will be flour, cheese and green vegetables. Those of iron will be meat, flour and green vegetables. The sole reliable and normal sources of vitamin A (beyond those from milk products) are again green vegetables and certain roots.

Now, it is improbable that the Calorie intake will be sufficient without good helpings of potatoes; the extent to which the available cheese is used in the course of a week's menus can in some measure be estimated from an inspection of the cook's menu book. On the other hand, the daily proportion of iron and of vitamins A and C (ascorbic acid) that should be obtained from the canteen meal is a matter of some importance. The main variable source of these three constituents is green vegetables. The problem is whether these three factors can be safely reduced to a single process of estimation.

Calorie, Protein and Ascorbic Acid Values

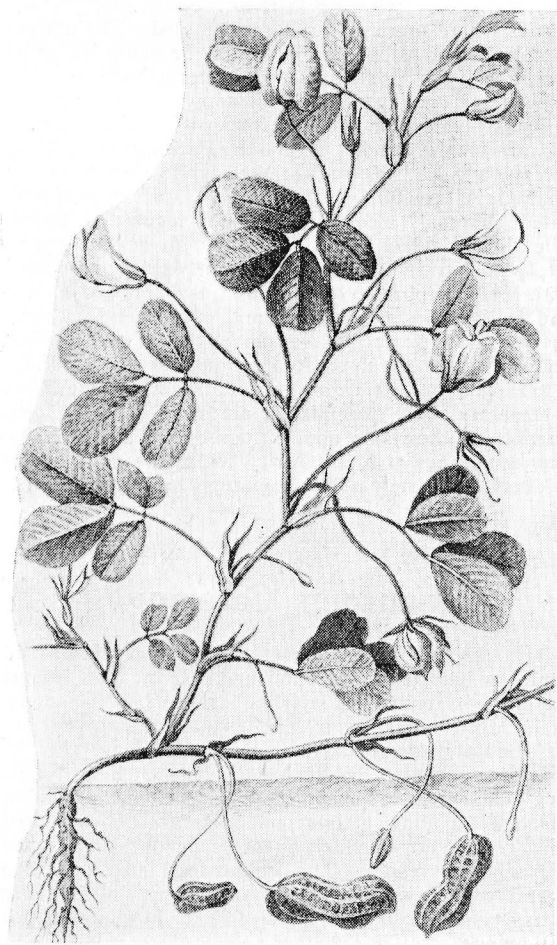
If the helping of potatoes is fairly constant, then the ratio of vitamin A to the ascorbic acid value of the meal will depend upon several factors. Taking a series of meals (which may to some extent be deduced from the menu book), the vitamin A content over the series will presumably be proportionately higher if it is the practice of the kitchen to use the outer leaves of cabbages and broccoli, and if mixed roots, including carrots, replace green vegetables in a number of the meals. The ratio of ascorbic acid will probably rise if it is found that raw vegetables, including watercress, are eaten in

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Olive and Arachis Oil

M. SCHOFIELD, M.A.

WITH FATS and oils such vital commodities in these days, the economical positions of French and Italian (?) African colonies is very much in the foreground. In Cyrenaica and Tunisia olive trees have been cultivated on a vast scale—there are 7 million trees at Sfax alone, line after line of regimented olives stretching to distant horizons and filling the great storage tanks at that port now well in the news. As for *Arachis Hypogaea* of classical botany (or the monkey nut plant to Mr. Everyman), the vast plantations of Senegal, Gambia and Nigeria are likewise a controlled agriculture, but of a weed; for arachis spreads itself in such a prolific manner that French production of millions of tons of oil per year is not surprising. The two oils, both staple fats for edible and other purposes, are now rivals, with arachis gradually assuming a dominance over the older product.



Arachis Hypogaea.

(Courtesy of Royal Botanic Gardens, Kew.)

In Cyrenaica the Italians have again lost their guns—and their butter. For to them, in contrast to our consumption chiefly as salad and sardine oil, olive oil is the staple fat for food and for glycerine production.

Antiquity of Olive Oil

Contrary to the popular idea, in North Africa the olive is no newcomer, for Theophrastus told how the olive was cultivated in Asia Minor and in Greece and then introduced into Cyrenaica. (It came from Palestine in the first place, according to De Candolle.) The olive indeed is the oak of the Mediterranean landscape, the tree of the Littoral which lives to an extreme age:

L'olivier est immortel, parce qu'il renait de sa soudre,

as the French describe a food producer of which specimens in Turkey are claimed to be twelve centuries old. To Shakespeare it was "the tree of endless age". And just as the cow is a solar engine for converting sunlight into fat, so the olive with its silver-grey leaves flourishing in the poor soils of Italy, France and North Africa performs a similar synthesis of fat. For maximum oil production, cultivation must be carefully controlled, pests like the olive moth and olive fly being continually fought, until, after fifteen years, the harvest of fruit containing up to 65 per cent. of golden oil is gathered with as much rejoicing as when the Hebrews anointed kings and priests with it and showed their own prosperity by simply oozing with it after anointing. "Let your soul delight itself in fatness" was the cry of the prophet, which could only refer to olive oil or mutton fat.

Olive Oil Production

Olives are picked by hand except in Greece, Spain and areas in Asia, where beating down by poles is a practice giving rise to inferior oil, particularly when allowed to lie on the ground for a period. For the finest edible oil can come only from a harvesting in which the oil is removed as soon as possible from the putrescible pulp—otherwise rancidity sets in remarkably quickly, and the oil will not then satisfy the demands for an edible product almost free from free fatty acids. "Virgin oil" is water-white or golden-yellow, and comes from fruit hand-picked just before it is fully ripe. As is often the case with an ancient industry surviving (or increasing in this instance), every conceivable type of press for extraction is in use from the most primitive to the modern hydraulic. First and second grades of edible oils are derived from the first and second pressings. The third grade, or "technical", is obtained from treatment with hot water and further pressing of the residue, while a *huile de ressence* is yielded by hot-water treatment and skimming off the supernatant oil. So thorough is the removal that yet another inferior grade named "sulphur olive oil" comes from an extraction of residues with carbon disulphide. It must be realised that modern economics is developing the oil in line with

the new intense cultivation in North Africa of the tree. The oil has found many other uses apart from those in the food industries, some of which will become even more prominent when the world's supplies of petroleum oils are exhausted. Thus it is an efficient textile lubricant, while its incorporation in engineering lubricants for withstanding higher temperatures is a pointer to the wider developments. In passing, let it be noted that the Romans used both the oil for food and cookery and unripe olives as stimulants for the palate—as is the case to-day.

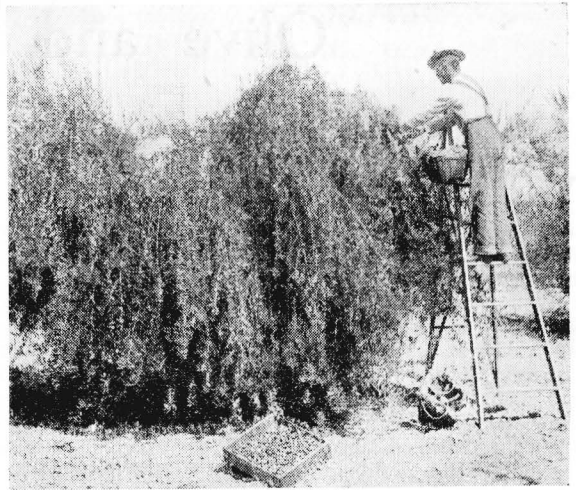
Arachis Oil

The arachis, so prolific that it yields as much as 38 bushels of kernels per acre, has its habitat in India, China, Malaya, Japan and America (where pea-nuts are sold at every street corner). But French North Africa furnishes the example of extreme cultivation and rapid increase—so extreme that pea-nut oil was (or is) to be fuel for the Trans-Saharan Railway, construction of which was rushed along under Vichy's direction by an army of wretched refugees from the Spanish war. Two types of arachis plants must be distinguished—the “bush” or “bunch” erect type cultivated, and the “runner”, which spreads as a weed in Senegal and Gambia by a peculiar natural method of propagation. In this process the flower withers, the stems elongate on one side, thus bending the pod over to such an extent that it sets itself in the ground, where the seeds mature—hence the term *pistache de terre*. This is not to be confused with the highly prized pistachio nut from Syrian *Pistachio Vera*, which was introduced into Rome in the days of Tiberius, into Spain by Flaccus Pompeius, and formed part of the present which Joseph's brethren took with them from Canaan.

As early as 1596, Monades told how he saw arachis blooming near the river Maranon in Brazil, while three centuries ago the chemist Marggraf gave a description of the plant. Like so many other South American plants (for example, the potato and cinchona), arachis became of high commercial value. This was due to a Frenchman—indeed, the arachis in commerce is very much a French affair, especially when one includes its use in margarine after that commodity had been introduced by Mège-Mouries in his factory at Poissy as a result of Napoleon III offering a prize for a butter substitute after the Franco-Prussian War. Monsieur Jaubert, forgotten colonist of Gorée, near Cape Verd, had the honour of championing arachis oil in commerce when little was thought of it. In a light sandy soil in sunlight, then, arachis, when protected against the destructive Rosette disease, is a powerful rival to the olive and furnishes a food product more widely used than olive oil.

Primitive African Methods

African natives made pea-nut oil long before the French came on the scene. Their primitive method is to roast and grind the nuts, following this by boiling the paste until the oil separates as upper layer. Extraction by pressure is also known to them, not only for providing a cooking oil, a pomade and an illuminant, but for frying the nut paste with condiments to give a kind of dough nut from the ground nut! Natives obtain a poorer grade oil as a result of roast-



Picking Olives, California.

(Courtesy of Royal Botanic Gardens, Kew.)

ing, and in decorticating in their wooden mortars and pestles where so many nuts are damaged. The natives complete their utilisation of arachis by using leaves as pot herbs, the haulms as dry season fodder. The French are equally versatile in applying the extracted cake as fodder for dairy cows; an inferior cake as manure for the market garden area around Marseilles; “Nigeria cake” as fuel bricks; while they have not ignored the possibilities of nut shells as a source of activated charcoal, alcohol, fibre and insulation board. The high-grade oil, containing arachidic acid as glyceride, is golden yellow, of pleasant nutty taste and odour, and, if conforming to specification as edible oil, is clear and brilliant in appearance, and of no deeper colour than 50 yellow and 5 red on Lovibond's equivalent scale. A table oil, an oil for sardines, for soap-making, a lubricant for textiles and especially for watchmakers—these are a few examples, apart from margarine-production, of the rising applications of arachis oil. The new economics of North Africa will prove as powerful in effect as the new political changes are likely to be.

Canteen Catering

A book* designed to meet the needs of industrial canteens has just been published. It includes menus for dinners, recipes for snacks, basic recipes for soups, main dishes, puddings, etc. Quantities given are based on portions for 20 to 25 and 100 persons.

It is essentially a book for use in the kitchen. Nutritive values have been given expert consideration throughout, and wartime food facts are clearly stated in a concise form which presents no difficulty to the non-scientific reader. The present food supply position—and the probable further curtailment in the near future—has also been a guiding factor in planning this little work.

* *Practical Canteen Catering*. Industrial Welfare Society (Inc.). Pp. 64. 2s.

Food Analysis

PROGRESS IN 1942

Part I

D. W. GROVER, B.Sc., A.I.C.

THE DETERMINATION of water in foods and biological material, although the most frequently made analytical operation, is not a simple matter and in most cases the figure obtained is to some extent empirical. Close adherence to set procedure is necessary to give reproducible results. There are several causes for this difficulty in arriving at what may be called an absolute figure. Water may be either "free" or "bound". Water of crystallisation may be lost to an indefinite extent. Sensitive substances may decompose or oxidise. Evaporation of the water may cause the removal of other volatile constituents. It is not surprising, therefore, that methods for moisture determination are constantly under review. A discussion of the apparatus available for moisture determination in fertilisers¹ contains something of interest to food chemists. The uses of rapid circulation of hot air, vacuum drying, distillation and extraction methods are discussed, as well as the measurement of physical constants such as electrical conductivity. An advantage of physical methods, including, of course, refractive index and density determinations, is that no modification of the condition of sample is caused. Unfortunately these are not absolute, and the results must be calibrated against some other method which does not possess this advantage. A method originated by Vincent and Simmons for the analysis of insulating material has been found suitable for small amounts of moisture in biological samples.² Water is driven from the sample by heating in an evacuated vessel and the water vapour pressure measured after bringing to standard temperature. Measurement of the pressure developed on mixing finely ground material (*e.g.*, flour) with calcium carbide is the basis of a moisture tester recently described.³

Ash Determination

Wichmann in the United States has published further investigations on the ash determination of foods having a basic residue. Earlier work had shown that alkaline earth carbonates lose carbon dioxide at temperatures below ashing temperatures. It was hoped that errors from this cause would be eliminated by treating the ash with ammonium carbonate and water, and drying at some temperature high enough to remove the latter but low enough to maintain the magnesium, which is the most troublesome of the metals, as carbonate. Unfortunately the various components did not oblige by following this scheme. Water is strongly retained and heating to temperatures which decompose some carbonate is necessary to remove it. The results so far do not offer any better method of ashing than to ignite at some definite moderate temperature; 550° C. is suggested as suitable.⁴

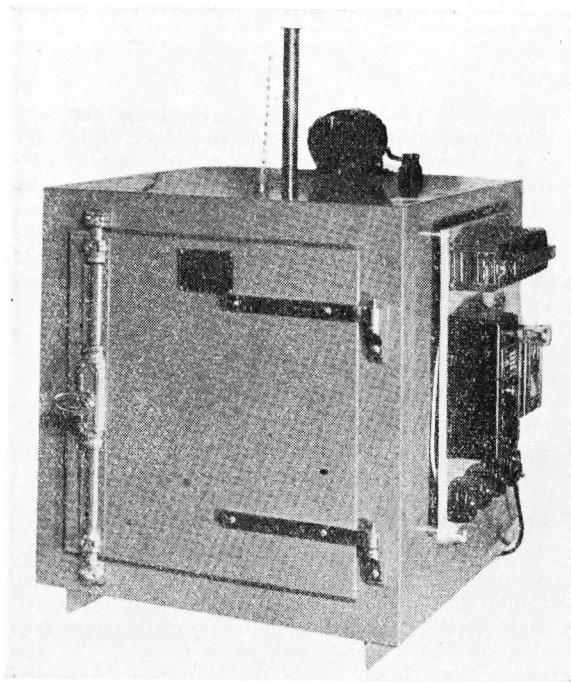
Nitrogen-to-Protein Factor

In reporting the results of the analysis of a protein-containing food, there is sometimes some doubt as to

the correct factor to use for converting nitrogen to protein. A recommendation by the A.O.A.C.⁵ combines very well the advantages of using a factor correct for the particular proteins present and of using a constant factor irrespective of the material analysed. It is suggested that three factors be adopted: 5.7 for cereals, soya products, etc.; 6.38 for dairy products; and 6.25 for meat, eggs, vegetables, fruit, etc. This scheme does not include provision for gelatin, for which the factor of 5.55 has become customary. In all cases the factor used should be made evident in the report.

Dairy Products

The resazurin test has been adopted provisionally by the Ministry of Agriculture as a means of rejecting milk of poor keeping quality. The details of the test, including cleaning of apparatus, are specified. According to a commentary published recently⁶ the grading given by the proposed procedure will result in only the worst supplies being rejected. If and when a general improvement of milk quality becomes possible the incubation period could be increased above the present ten minutes. The test is more sensitive than acidity determination, being capable of detecting milk of poor keeping quality during its induction period.



Controlled Air-circulated Drying Oven.
(Courtesy of Townson and Mercer, Ltd.)

The theory underlying the resazurin reaction is discussed by Davis.⁷ The reduction takes place in two stages: resazurin (blue)—resofurin (pink)—dihydroresofurin (colourless). The first change is irreversible, being determined by the ability of the system to react with the oxazone oxygen atom. The second is reversible and depends chiefly on the oxygen tension of the system. Although the precise mechanism of the chemical changes occurring is not yet understood the test is a valuable one. Other recent publications add considerably to the knowledge of the resazurin test. Morgan⁸ has made a statistical examination of a large number of tests on milk from small herds. His conclusions are largely favourable. Only 9.7 per cent. of the samples gave completely anomalous results, and 60 per cent. of samples abnormal for other than bacteriological reasons could be detected. Davis⁹ has made a recent review of the application of this test in FOOD MANUFACTURE. Reference should be made to the original. The considerable bibliography appended indicates the extent of interest taken in the subject.

Cheese

One difficulty encountered in the analysis of cheese is that of correct sampling. Plug samples taken from cheeses, for instance, have a significantly higher moisture content than wedge samples.¹⁰ The former can be made more representative by cutting diagonally and taking the outer half. The constants of the fat extracted from cheese vary according to the method of extraction used,¹¹ particularly the R.M. value. This is low when ether is used for the extraction, probably owing to loss of volatile acids.

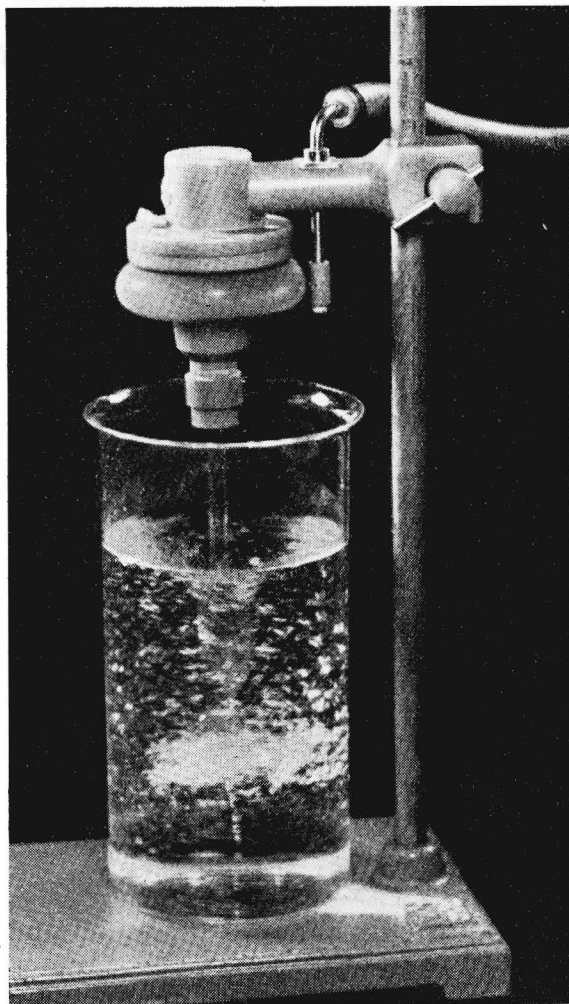
Interest in the oxidative reactions which occur in dairy products (e.g., the action of oxidases) has led to the development of a polarographic method for the determination of dissolved oxygen based on that already in use for water.¹²

Egg

The refractive index of egg white has long been used as a convenient measure of soluble solids. Early attempts to adapt this to whole egg or yolk were unsuccessful owing to the dispersing effect of the incompletely soluble lecithovitellin globules leading to an indistinct line. One method of overcoming this is to treat the egg with a proteolytic enzyme.¹³ No change in the refractive index of the system is caused, but improved readings are obtained. The baking quality of dried egg is a matter of considerable importance now that it is the only form of egg obtainable to the trade in the United Kingdom. For making sponge cakes a laboratory test consisting of measuring the volume increase resulting when reconstituted egg and sugar are beaten together has been found to give a grading closely parallel to the baking quality.¹⁴

Meat and Fish

The analysis of meat products, such as sausages, becomes more involved as a greater variety of cereals and so on and of parts of the carcase are incorporated in these foods. Callow¹⁵ publishes some more data bearing on the water-protein ratio of beef. All the figures agree closely with the empirical formulæ, which also comply with published American analyses. Unfortunately, as is pointed out by Osman Jones, these data do not apply to the wide variety of offal now



"Turbinia" Stirrer at Speed.

(Courtesy of Townson and Mercer, Ltd.)

included in meat pastes and sausages made in this country.¹⁶ Many of these have markedly low nitrogen contents compared with fleshy meat. Another source of error in calculating the meat content is the change which has occurred in the types of cereal filler now used (i.e., semolina and wheatmeal rusk instead of rice and white rusk).

Soya flour introduces serious analytical difficulties owing to its high protein content and the obstacles in the way of its accurate estimation. Two methods are available for the estimation of soya in admixture with meat. One, a chemical method,¹⁷ is based on the determination of unfermentable reducing sugars, and the other, a biological method,¹⁸ involves a precipitin reaction with the serum of the blood of a rabbit inoculated with soybean extract. Neither of these methods is sufficiently rapid for routine analysis. Agar-agar can be detected in meat jellies by clarifying with trichloroacetic acid, precipitation with alcohol and testing the precipitate with iodine and by its ability to form a jelly.¹⁹

(Continued on page 45)

The Baking Industry

PROGRESS IN 1942

J. STEWART

(National Bakery School, London)

THE PAST year has proved an epoch-making year as far as the baking industry is concerned, for it has seen the eclipse of the white loaf and the use of white flour in confectionery and biscuits for the duration of the war, with a possible continuance for some considerable period afterwards.

The Bread Trade

When the change-over to National flour came in April, 1942, many difficulties were encountered, and during the ensuing three months these became more acute as stocks of white flour became exhausted and new flour had to be used alone in the mixes.

The millers were continuously experimenting to produce the best coloured flour with as low a brown content as possible, and also to maintain the correct length of extraction; in consequence the meals were never regular. Fortunately during this period a high percentage of Manitoba wheat was available, and this enabled the millers to produce improved flour with good baking qualities, whereby voluminous bread with a reasonably light crumb could be obtained.

To-day, however, there is still a considerable variation in the colours of the flours being produced, but gradually the wide range should be narrowed. Since September last, *creta praeprata* has been added to National flour in many mills and no one seems to have been aware of its presence; certainly from the practical point of view there has been no difference in the handling of the doughs nor in the fermentation of them.

Following on the series of lectures on baking, bread competitions were instituted; when a final one was held in November over 5,000 loaves were submitted. This competition was unique inasmuch as the bread was judged when five days old. All the bread was sound, free from mould or mustiness and was moist and quite palatable, despite the fact that it had been kept in parcels all that time. This, Lord Woolton said, gave the lie to the statement that National bread will not keep. Provided it is stored under proper conditions it will keep without unduly drying out or developing mould. If, however, it is kept in enclosed containers or in damp places, it will go mouldy more rapidly than white bread, as is the case with wholemeal and brown breads in general.

Investigational Work

During the year, work on problems connected with bread and confectionery has been carried out in many of the laboratories connected with the baking industry and in the bakery schools. When there seemed a danger of trouble being experienced by the development of "rope" in National bread, the Ministry of Food issued a pamphlet on its prevention and a panel of advisers worked out the quantities of acid to be used for this purpose, while the British Arkady Company worked out a method of using sour dough as a means of acidifying dough, which was quite successful.

Further work has been done on methods of producing bread in an emergency. Following on the early work done on malt barns, whereby small quantities of yeast were utilised, improvements were effected so that the process was applicable to automatic plants. Other methods were evolved, using old ideas and developing them on scientific lines. The whole work was incorporated in a booklet issued by the Ministry of Food in August, 1942.

Following the issue of this booklet, lecturers have toured the country demonstrating the methods, and it is hoped eventually that every baker will be familiar with emergency procedure should the need for such ever arise.

Work has also been carried out on the utilisation of dried eggs in confectionery.

Bread production has been well maintained during the year despite the difficulties which have had to be faced in those areas where bakeries had been destroyed by enemy action. Many of these have been put into commission again and others will soon be functioning.

Despite the National loaf, bread consumption has increased, and these demands have had to be met with reduced staffs in most bakeries, and female labour is now being used in many of them. Until now the production staffs have not been seriously depleted, but the calling-up of younger men is now being felt as well as the drift into other trades which has also occurred.



At the Ministry of Food Exhibition. Scotland shows how potatoes can be used in flour confectionery. From left: Mr. W. Mabane (Parliamentary Secretary to the Ministry of Food), Mr. W. S. Goodfellow, Mr. J. H. Stuart and Mr. A. Bostock.

The Ministry of Food have undertaken a census of production in the endeavour to establish a standard of man-power production for various types of units of production in all sections of the baking industry—i.e., bread, confectionery and biscuits. When this has been completed some most interesting data should be available which will enable better guidance to be given to the Ministry of Labour on the essentiality of man-power for different types of bakeries and so provide guidance for the transfer of labour.

While in normal times considerable economy in man-power could be effected by the installation of machinery for many operations, this is not now possible under the system of priorities. The lack of adequate modern machines in many bakeries is already showing itself acutely. Those who had the foresight to purchase new plant, such as dividers, moulders, mixers and depositors, prior to the war, when such purchasing was strongly urged, are now reaping the advantage.

There have been difficulties in the matters of materials and supplies during the past year, and these are not likely to diminish. This year, new and more complex ones will have to be overcome, mainly arising from shortage of supplies.

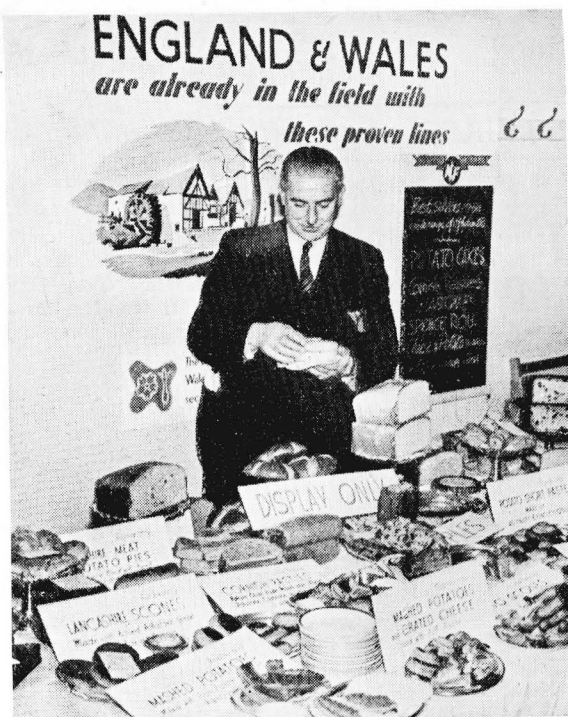
During the past year confectioners have had to adapt their mixings to be made with National Wheatmeal flour in place of white flour in the making of all types of flour confectionery, and this has worked fairly smoothly in many bakeries.

The Cake and Flour Confectionery Order

The biggest change during the past year was the introduction at short notice of the Cake and Flour Confectionery Order, whereby a maximum percentage of 20 per cent. fat and 30 per cent. sugar is allowed in all types of confectionery, or a total of 45 per cent. of these two ingredients where either of them exceeds the limit allowed in any mixing. The maximum selling price of 1s. 6d. per lb. for confectionery, or three times the cost price, whichever is the lower, on all cakes cost-



The Irish stall at the exhibition. Lord Woolton discusses potato farl with Mr. Sleath and Mr. Barroman.



England and Wales put up a good show. Mr. H. Marriott, of the Birmingham C.W.S., examines one of the products.

ing over 4d. per lb. will tend to curtail profits in many bakeries. There should be no change in the selling price or profit made on goods costing less than 4d. per lb., since these can still be sold at a maximum price of 1s. per lb.

Flour confectioners have had a busy time revising their recipes in order to make their products comply with the new Order and to make sure that they were selling their confectionery at the permitted prices. Many have had to learn how to work out costs and percentages of fat and sugar in their mixings. It has been an eye-opener to many who had not previously studied costs and percentages.

Bakers have to realise that the percentages of fat and sugar in most raw materials is not constant, but varies slightly from sample to sample. They have no control over these variations. In the case of manufactured products, such as chocolate couvertures, jams, artificial cream, macaroon pastes, lemon curds, etc., it will be a wise precaution to obtain a statement from the manufacturers of the fat and sugar content of these manufactured goods, on the invoice with each consignment, in order to make sure that their own products will not infringe the new Order. This is a step in the right direction of specification of bakery raw materials which many of us have long advocated.

It is now more than ever necessary to know the percentage of loss that occurs during baking, since the fat and sugar content has to be assessed on the confectionery after baking. Therefore it is necessary to allow for the loss of weight during baking when calculating out a recipe for its fat and sugar content and cost price. This baking loss varies with the type of

cakes made, but for general purposes the following will act as a guide :

The loss on cakes baked in hoops (such as Madeira and Fruit) will be 8 to 10 per cent. ; Buns and Scones, from 9 to 10 per cent. ; Sponge Sandwiches and Sponge Cakes, about 15 per cent. ; Swiss Rolls, about 18 per cent. ; Slab Cakes and other such large goods will lose from $7\frac{1}{2}$ to 10 per cent., depending on the quality of the recipe and the heat of the oven.

It is always advisable to allow for the maximum loss in the calculations in order to be on the safe side and so allow for any that may be overbaked or lose weight by becoming stale. When possible, it is a wise precaution to check the weight of the finished products after manufacture.

When calculating the recipe, material costs are usually worked out after deducting the expected loss in weight from the gross weight of the mixing. The cost per lb. for cakes to sell at 1s. 6d. per lb. should not greatly exceed 6d. When a recipe is too expensive the cost can be reduced by using less liquid egg (which is the most expensive ingredient) and replacing it with milk and baking powder. When the cost per lb. has been found, it is then necessary to find out the percentage of fat and sugar in the mixing, not forgetting to allow for the fat and sugar used in any finishing material, such as jelly and chocolate.

The Ministry of Food have been anxious that all consumers should use more home-grown foodstuffs in order to save importing foods. There appears to be plenty of oats available at present, since the authorities are considering adding a percentage of oats to flour. As oatmeal is a splendid heat and energy producing food, its possibilities should be considered as an ingredient of confectionery. We have long been familiar with Oatcakes and Oatmeal Parkin ; these can be made in conformity with the Order.

Oat flour is now being milled and can be used to replace wheaten flour to the extent of 15 per cent. in some goods, and even as much as 25 per cent. in others.

Mashed Potatoes

In the past the use of potatoes in the bakery trade has been confined to the production of potato pies and pasties, except in the North, where a large trade was done in potato scones and cakes.

Last year some experiments were made with potato flour in both short pastries and cakes in order to make the fat ratio go further ; these experiments demonstrated that it is possible to use up to 10 per cent. of potato flour with good results.

Investigations have been made and are still continuing to ascertain ways and means of using mashed potatoes in confectionery products. The mashed potatoes can be used in cakes, fillings and short pastries, where they have a shortening and moistening effect on the goods produced. By their use more palatable moist eating cakes can be produced with the present actions of fats and sugar. They not only make the rationed goods go further, but they help to keep the goods moist and mellow and prevent crumbliness in cakes.

Experiments are proceeding on the best way to cook potatoes to be used in flour confectionery ; up to now potatoes baked at 300° F. for an hour have given the best results.

Confectioners are urged to make the best of their available materials and to make them go as far as possible by the use of home-grown cereals and vegetables.

To Conserve Labour and Chocolate

FACTORIES now engaged in the production of slab candy, such as caramels, nougat and other short or chewing candies, will find it quite economical to form the batch in different sizes, shapes, colours and flavours. For instance, a short nougat is dipped in caramel, then rolled in ground nuts to form a roll. The nougat nut roll is then cut into slices, or thin sheets of caramel can be combined with the short nougat to form layers which can later be cut into bars, squares or oblongs, then wrapped in waxed paper or cellophane. Or the caramel to which nut meats have been added may be formed into sheets, cut into bars and wrapped in cellophane or coated with chocolate. The nougat or caramel nut and chewing combinations may be cut into bars approximately one to one-quarter inch wide and ten inches long, then coated with chocolate and, shortly after the chocolate sets, these lengthy bars may be cut into short oblongs, thus conserving chocolate and incidentally producing a wider variety of candies of the same foundational batches. (*Confectionery News*.)

Food Analysis.

(Continued from page 42)

Fruit and Vegetables

The Americans make extensive use of potassium as an index of fruit-content of jams, etc., and are consequently on the look-out for more convenient ways of estimating this constituent. Gerritz²⁰ describes a volumetric chloroplatinate method which is more rapid than the gravimetric procedure. The sample is ashed with magnesium nitrate, and the potassium precipitated with excess reagent. This is collected on a calcium carbonate bed, decomposed by ignition with soda and the chloride determined volumetrically.

Determination of starch in roots by the A.O.A.C. diastase method is liable to give high results owing to the action of the enzyme on non-starchy matter.²¹ Pretreatment with calcium or barium hydroxide largely eliminates this error. An attractively simple determination of starch in roots, seeds, etc., consists of treatment of the sample with potassium thiocyanate, centrifuging and precipitating with alcohol.²²

Fats and Oils

An interesting contribution to the analysis of fats and oils is a method described by Thornton and Broome for the estimation of lecithin in the presence of other phosphatides by its choline content.²³ The choline is precipitated from aqueous solution by ammonium reineckate, a chromium/ammonium/thiocyanate complex. This is dissolved in acetone and estimated photoelectrically. Bolton and Baskett²⁴ have examined the correlation between the iodine value and firmness of pig depot fats, and have found the one to be a good index of the other. For the examination of bacon fat the most suitable tests for rancidity are stated to be peroxide oxygen and the Kreis test.²⁵

The second and last instalment of "Food Analysis" will be published in the next issue. A full list of references will be given in the last instalment.

Californian Views on Food Problems

A SERIES of pamphlets* collectively entitled "Food in Wartime" have recently been published and are listed in the order of their appearance. They are mainly economic, and appear to be an attempt by the University of California to educate the (Californian) public to some realities which now seem rather elementary to us. In the United States they will no doubt serve a useful purpose, but seen from this side of the Atlantic they appear to be distant in more than one sense—much as the well-meant printed musings of an armchair strategist in London might appear to an infantryman in the Libyan desert.

The first pamphlet presents a brief but useful summary of reasons for food rationing and of the histories of food rationing in Germany, Britain, the United States and elsewhere during the last war and this. It calls for no special comment except by reason of its recommendation that the United States cannot do better than pattern its food-control machinery upon that of the United Kingdom. The story that during the last war British agents added to the food confusion in Germany by distributing large numbers of forged ration cards is new to the reviewer.

The second pamphlet is by the same author, but shows a remarkable change in style. Perhaps it is because it was intended to make a complicated subject appear simple that the author has indulged in numerous lengthy "glimpses of the obvious". Thus a presentation of arguments about the need for reducing moisture and bulk leads to the conclusion that "concentrated foods with excess moisture removed are therefore not only less bulky but also less perishable than bulky foods with a high moisture content". And elsewhere: "As it will not be necessary for us to ship food to Australia, the cargo space can be used to carry larger quantities of war materials."

Planning for Total Food Needs is a sober plea for greater corporate understanding of the value and right use of food. It takes its spring from the admonition that "the kitchen range is an instrument of national defence". The food problem is viewed as a whole—not only in respect of utilisation, but also briefly from the world geographical standpoint. In one matter the author has been misinformed, for it is no longer generally true that in Great Britain rationing has been unable to equalise supply and demand because "the income-price ratio is such that large numbers of the

* *Rationing and Control of Food Supplies*, by J. M. Tinley, pp. 26; *Wartime Transportation and Distribution of Foods*, by J. M. Tinley, pp. 26; *Planning for Total Food Needs*, by E. C. Voorhies, pp. 34; *Farm Problems in meeting Food Needs*, by R. L. Adams, pp. 32; *Adapting Fruit and Vegetable Products to War Needs*, by W. V. Cruess, M. A. Joslyn and Gordon Mackinney, pp. 38; *Control of Food Prices*, by J. M. Tinley, pp. 33. University of California Press. 1942. Price 25 cents each. London: Cambridge University Press.

poorer people are unable to purchase all their ration allowances". This has ceased to be true of butter and bacon, and we can assure our American friends that if the full cheese ration is not taken up it is not on account of price or poverty, but because the ration is too generous!

The fourth pamphlet can be commended to those who are interested in the agricultural aspects of food production; it presents the best concise outline of the basic difficulties of farming which this reviewer has seen. Part of this might well be incorporated in some senior school textbooks. The size of the Women's Land Army in Britain has been unduly magnified. There is a potentially useful table of goals or expected production of farm crops for 1942 in the United States, but it is hard to believe that the area under tobacco is equal to that under maize—some 90 million acres.

The fifth pamphlet is not only the one most likely to be directly of use to food manufacturers but seems to have been the most carefully prepared. This suggests that the others would have gained if they had been "vetted" by several people instead of being individual responsibilities of the authors concerned. The pamphlet offers a good review of some practical aspects of drying, canning and freezing of fruits and vegetables.

The last pamphlet presents a study of food prices, and is in effect a discussion of the possible modes of price control in the United States. We learn with surprise that the Canadian price-control machinery is "the most drastic so far adopted in any democratic country, since it freezes retail prices, wages and salaries, and rents". Further on some points emerge which have little or nothing to do with the merits of the pamphlet, as when the author credits the Canadian Government with the determination that the retail price ceiling shall not be punctured. The terminology of food control may make an interesting study, since prices can not only have ceilings, but can also undergo freezing and rolling back. The image of a ceiling being pierced by an unfrozen rolled-back price is one which the reviewer cannot easily call up, but probably the limitation is due to ignorance of economics.

H. N.

Soft Fruit Growing

There is a type of book which demonstrates on every page the enthusiasm of the author. Such a one is by Raymond Bush.* Written in the most plain language and with the greatest economy, it tells most of what there is to tell about the subject. There are some useful illustrations, giving practical instructions on pruning and cutting and also the training of the different plants. An excellent handbook.

* *Soft Fruit Growing*. By Raymond Bush. A Penguin Special. Pp. 170. 9d. net.

Food Manufacture

Road Transport of Food

PROGRESS IN 1942

IT IS ALMOST impossible, in any such article as this, to be completely up-to-date with information as to the conditions governing the transport of food by road: the situation changes almost daily. One thing, however, stands clear; appreciation of the value and utility of road transport, as being much more economical and convenient than any other, is greater than ever before. Its proportionate advantage, of course, varies according to the class of foodstuffs, being highest in respect of market garden produce and perishables and lowest as regards tinned foods and the like.

Garden Produce

Typical of the manner in which preference for road transport is being inadvertently fostered is the recent restriction on the movement of market garden produce by road from Bedfordshire. From this area the bulk of the traffic is consigned to Covent Garden, distant some 45 to 50 miles. This particular regulation, reports of which reached me as I prepared these notes, forbade the conveyance of the produce by road: all of it must go by rail.

Now every market gardener, and every food expert as well, knows that the shorter the time which elapses between cutting and sale, the better the product, the richer it is in vitamins and the more palatable it is. This factor is accurately reflected, moreover, in the prices which the produce fetches in the market.

The practice, with road transport available, is to cut the product as late in the day as daylight will permit, place it on lorries which travel by night, and deliver to the market so soon as it opens. That is impossible when railway service only is available. The produce must be cut earlier, so that it can be delivered to the nearest station before it closes. It is late in reaching the market—occasionally even a day late—and suffers in consequence. The quality is not so good and the price obtained is much lower than if it had been conveyed by road.

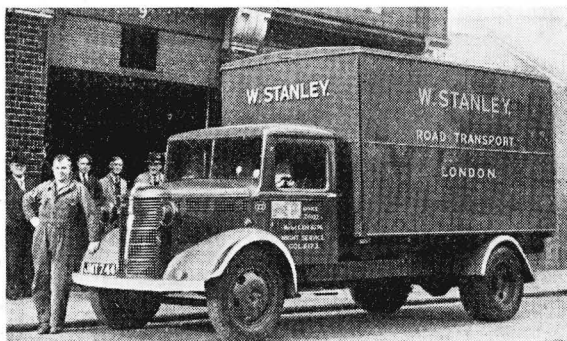
It is reasonable to assume that these facts are known to the Ministry of Food and that the need for conservation of petrol and rubber outweighs the necessity for making the most of our food supplies.

That the vehicles concerned are just as fully employed in other directions, using the same quantities of petrol and rubber, may or may not be of consequence. The solution of the problem arising from that circumstance may well be that the traffic the vehicles are now carrying is more important than food. But one wonders.

Trend of Food Transport

However, the foregoing is to some extent by the way. My purpose in this article is briefly to review the trend, during the past year, of the use of road transport for the carriage of foodstuffs, with particular regard to the effect of restrictive legislation and the way in which operators of mechanical transport have organised themselves to meet each new development.

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Modern Road Transport.

(Copyright "The Commercial Motor.")

Before proceeding to deal in detail with some of the schemes which have been put into operation during the year just passed, I should like to refer to developments which have taken place, in the same period, in connection with two matters with which I dealt a year ago. They are the plan for the distribution of meat and the Government haulage scheme.

The method of distributing meat and livestock has developed into the biggest thing of its kind. In that light I consider it deserving of a more extensive reference.

Distribution of Meat

When the necessity to arrange for the distribution of meat throughout the country arose, there was no previous experience of any similar operation to give guidance to those who had to carry out the work, for meat was one of the first commodities to be controlled. Actually the initial stage involved the transfer from private management to pool operation of 1,600 vehicles owned by a hundred different operators.

The operations as a whole were divided into two categories—heavy and light. The former comprises those vehicles which undertook deliveries from ships to cold stores and from cold stores to the distribution depôts which the Government had set up for the purpose.

In the main the pool was formed to deal with bulk movements throughout the country and retail deliveries in London and the Home Counties only. After a time responsibility of the road deliveries throughout the country was taken over, and eventually the transfer of livestock from markets to slaughter-houses. As indicating the extent of the operations performed by this organisation, it may be stated that the retail distribution side alone had to provide for two or three deliveries each week to no fewer than 48,000 butchers' shops. It is stated that the pool saved the country £7,000 per week even in its early stages. This saving related only to 1,600 meat pool vehicles and did not include the 5,000 contract vehicles and livestock

vehicles. The turnover in the first year of control exceeded £3,000,000, representing a wholesale commodity value of £250,000,000.

Government Haulage Scheme

As regards the Government scheme, I stated in the article written just a year ago that it was about to be inaugurated. It is a significant commentary upon that scheme and its success to state that once again the position is as it was a year ago. I am able to state that a new Government scheme to deal with road haulage is about to be inaugurated.

Under the new scheme only long-distance transport is, for the time being, to be controlled—that is to say, traffic which is to be conveyed for distances of 60 miles and upwards. Movement of bulk liquids and “smalls” is not at present to be included in the scheme.

It is estimated that some 25,000 vehicles now engaged in this long-distance traffic will be directly controlled by the Government as the scheme is brought into operation.

The country is divided into twelve areas, coinciding with the Civil Defence Regions, and each division will be sub-divided. The divisional and area haulage officers will be mainly drawn from the haulage industry, but will not be actively associated with the running of any private road haulage business while they hold office.

Vehicles will be grouped into about 450 units, each centred on a firm with the necessary facilities. There will be a controller for each unit, who will normally be a member of the staff of that firm.

Owners of the controlled vehicles will retain their business identities and will continue to maintain their own vehicles and employ their own drivers.

Area officers and unit controllers will be responsible for seeing that no traffic is accepted which should be carried by some other form of transport in the interests of conservation of oil and rubber. Traffic accepted will be allocated to controlled vehicles by the unit controllers, who will be responsible for seeing that no vehicle returns empty to its base if goods are available for it. Short-distance traffic carried under the existing road haulage scheme will continue to be dealt with by the area officers.

Close contact will be maintained with the Regional Transport Commissioners' organisation, who will supervise the issue of fuel to the units. As part of the general campaign for economy, they will review the work of traders' motor vehicles (operating under “C” licences) with a view to reducing empty or light running. Long-distance traffic of this kind will be transferred to controlled vehicles where this will result in economy.

Operators of vehicles engaged in the longer distance haulage will be invited to enter into agreements with the Ministry. Some haulage undertakings, whose general facilities as well as vehicles are required, will be taken over by the Ministry as a whole, and in such cases remuneration will be on the basis of a guarantee of the net profit of the undertaking for the average of any two accounting years selected by the undertaking within the period January 1, 1935, to December 31, 1938.

Vehicles of other long-distance carriers will be hired according to a fixed schedule of rates, which will be paid irrespective of the use of the vehicle. Any vehicle

which is surplus to requirements will be temporarily laid up, but will be maintained in a fit condition for immediate use. In the interests of economy it will be necessary to transfer to hauliers a certain amount of traffic now carried in traders' own vehicles. If a trader's (“C” licensee's) vehicle is rendered idle by the transfer of traffic and it is desired to keep the vehicle in reserve, an allowance for the interest on capital and necessary overheads would be paid by the Government.

These measures are intended to maintain the industry in an efficient condition as an essential reserve of transport, so that, despite the restricted supplies of rubber and fuel, a sufficient number of vehicles will be available in time of need. The question of finding suitable employment for drivers of vehicles temporarily laid up, so that they may be available at short notice, is under discussion with the Ministry of Labour and National Service.

Conditions in general, of course, have deteriorated since a year ago, inasmuch as besides the need for strict economy of petrol and fuel oil there is also the urgent need to conserve rubber—that is to say, tyres. Indeed, so far as the latter item is concerned, strict rationing has been put into force. New tyres cannot be acquired without proof of need, approval of the Ministry of War Transport and the relinquishing of discarded tyres in place of the new ones. Tyres can only be purchased and repairs effected at specified approved depôts.

Zoning

Control of the movement of foodstuffs by road; and to a certain extent by rail, has taken the form of zoning. Manufacturers are only permitted to distribute their products within an area specifically limited in extent. Country-wide distribution is thus denied to the majority and joint use of transport is encouraged and sometimes compelled. The arrangements are similar to those which have been put into effect in a good many towns and districts to provide for retail distribution. This aspect of road transport is perhaps outside the scope of this article, but reference to it is justified because the method is important. In any large town, tradesmen dealing in the same type of commodity form groups, each comprising two, three or four firms in a particular locality, and they pool their transport so that the same vehicle effects retail deliveries for all the firms comprised in a group. Savings up to 33½ per cent., both in petrol and in numbers of vehicles, have been effected in this way.

Examples of the way in which similar schemes are applied in respect of wholesale distribution may be cited. One such scheme concerns sugar confectionery—chocolate, toffee and other sweets. The output of each works of the members of the manufacturers' association, the Sugar Confectioners' Alliance, is allocated to a particular region most suited to its geographical position, and in that way use of transport in distribution is economised. For example, under this plan, chocolate made at York will no longer be sent to South-west England and chocolate made at Bristol may not be sent to the North.

So far as this particular commodity is concerned, regionalisation of distribution, according to this plan, is facilitated by the fact that members of the Sugar Confectioners' Alliance have agreed on an arrange-

ment whereby the goods they make are grouped into certain standard classifications.

Collection of Eggs

Similar plans are in operation for economising the transport needed for the collection of eggs. In Yorkshire, a company known as Yorkshire Egg Packers, Ltd., has been formed. Each egg packer in the county has an interest in the company, which is the marketing channel for about 10,000 poultry farmers with a potential annual production of 10,000,000 eggs. The number of packing stations is being reduced and the method of collection rationalised. Thus, whereas previously seven packers, each operating their own vehicles, have been collecting eggs from places virtually next door to each other, under the new arrangement the number operating in this same area is reduced to two. In the distribution of the eggs after packing, transport is being saved by the reduction of the number of points to which, previously, deliveries were made. In one large city in Yorkshire, for instance, fourteen separate wholesalers, to each of whom deliveries were previously made, have been replaced by one.

The Fish Problem

The most recent of these zoning arrangements, and one which is still the subject of severe criticism, is, of course, that relating to fish. This scheme provides (a) that fish landed at any of certain ports may be distributed within only a defined zone, but London can draw fish from all ports and the Birmingham area from two reasonably adjacent.

(b) Fish sent to inland wholesale merchants within each zone may be redistributed only to customers within 20 miles of the merchant's premises.

(c) In each zone there are defined sub-zones, and fish landed may be distributed to each sub-zone in proportion to its population.

(d) Equitable distribution is arranged between inland wholesalers, fishmongers and fish-friers, who will continue to handle the same proportion passing into a sub-zone as they did during the datum period July to September, 1941.

Collection and Delivery of Milk

One of the biggest schemes for the re-organisation of transport has taken place in connection with the collection and delivery of milk. Transport has been rationalised, and overlapping of collections as well as a number of cross-hauls has been eliminated. Instead of, as in the past, producers and distributors entering into individual contracts for milk transport, the Ministry of Food has now taken charge. Each buyer of milk must now obtain his supplies from a compact self-contained district, and no overlapping is permitted.

These schemes, while they have undoubtedly achieved the object of economising in fuel, tyres and the use of vehicles, have, as might have been expected, brought new problems to light of a kind typified in the earlier paragraphs of this article. As might be expected, difficulties arose during the summer in connection with the distribution of fruit. The problem was mainly the supply of baskets, and the difficulty in that connection arose because of the Government's

determination that the crop must be distributed by rail and not by road. In normal circumstances fruit is picked up to 10 o'clock at night and sent by road immediately, the baskets being brought back the next day for that day's picking. With rail transport, two days may be taken to convey the fruit to its destination and a further five days before the empty baskets are returned. Obviously, as the number of baskets available is limited, being now half what it was in pre-war days, distribution under those conditions is impossible.

Solution of Difficulties

It is hoped that ways and means of surmounting these difficulties will be devised—some improvement has already been effected in some cases. Possibly a revision of the basic principle may be necessary in some cases, whereby, instead of zoning distribution without regard to quantities, a principle may be adopted of controlling distribution according to quantity, arranging that those who produce in small quantities shall deal with local markets and those who produce in large quantities must send their products farther afield.

The Principles of Canteen Inspection

(Continued from page 38)

some abundance. If, however, the week's meals together with an estimate of the dishes actually served show a reasonable level of ascorbic acid, it may be taken for granted that the vitamin A intake is as high as can be expected. The same principle applies to iron. On the other hand, no estimate for vitamin A or for iron will give any sure indication of the ascorbic acid value of the meals.

If this be true, there seems no reason to estimate for anything beyond the Calorie, protein and ascorbic acid values of the dishes chosen. The total protein value of the meal should represent about half the day's consumption in the case of school and works canteens of the priority class and between a third and a half in the case of municipal canteen meals and those at non-priority works canteens.

Conclusion

When a community assumes the function of providing a necessary service or commodity, some degree of social responsibility follows; this involves an element of minimum guarantee, and that again implies a system of inspection. In the case of canteen meals, the early stages in the establishment of a nutrition inspectorate may have to be partly undertaken through voluntary agents; but clearly its initiation expresses the fact that the lay public cannot be expected to judge the nutritional adequacy of its meals; this is a matter for the expert. The principle is an important one in that it is the basis of any complete nutrition policy.

It is suggested that a well-run canteen will provide its own data, and that after a period of research it will be found possible to devise a method of classifying the data in such a way as to judge the canteen in relation to a standard. The main points on which investigation is now required are those concerned with the effect of various types of food storage, preparation and service upon the quality of the food consumed.

Food Planning in Peace and War

OPINIONS will probably differ as to whether there is a necessity or a justification for additions to the already copious recent literature on nutrition, but the perusal of the latest one* has converted at least one reader. There are the familiar tables to be studied and the well-known discussions on proteins, carbohydrates, fats, minerals, vitamins and Calories, which we must remember to spell with a capital C. As Professor Marrack remarks:

Recently some writers have used calorie for Calorie. Oddly enough, this slovenly practice is tolerated by the editors of the publications of the Medical Research Council. It sometimes leads to mistakes. One eminent physiologist calculated that a man's kidneys expend more energy in a day than his food supplies.

This is merely an example of the attention to detail which, coupled with a clear and picturesque style, characterises the author's writing. His book is sufficiently attractive to retain the layman's interest while forming a valuable reference book for the expert, although the absence of an index is a disadvantage.

Food Control in Two Wars

Professor Marrack devotes considerable space to food control since 1939 and also during the last war. He gives due credit to the work of the Ministry of Food in the present epoch, but does not hesitate to criticise it with considerable frankness. He objects to the control exercised in the interests of the big combines, taking as his text the history of the national loaf. He goes fully into the matter of the fortification of flour with vitamin B₁, a subject which has been discussed at considerable length in *FOOD MANUFACTURE*. An example of his strictures is as follows:

The fundamental fault of the Government food policy seems to be a desire to avoid drastic steps. Either the Government does not appreciate the seriousness of the position, or does not wish to appreciate the seriousness, or thinks that the public will not accept drastic steps. . . . What disturbs public morale is not privation, but injustice or the suspicion of injustice: in the distribution of food, not only should justice be done, but manifestly be done. . . . If people are convinced of the need, and believe that they are treated fairly, they will put up with much greater hardships than they have ever dreamt of so far.

Crop Production

Professor Marrack, considering the matter in terms of energy, thinks that the question, "Is it better to use land for production of crops that can be used directly as human food, or for the production of feeding stuffs for animals?" is simple. In terms of Calories animals give a poor return for the food with which they are fed, for an animal has its basal metabolism to maintain. An average cow expends some 6,000 Calories a day just

in being a cow, while the energy value of the daily milk yield is only about 4,000 Calories. Actually a cow returns about one Calorie in milk for every five food-Calories. Production of other forms of animal food is wasteful. Obviously, as he says, there are other considerations, animals being more efficient as converters of protein than of Calories.

Diets in Different Countries

The adequacy or otherwise of the diets in different countries is discussed. On the vexed question of calcium Professor Marrack quotes Orr's conclusion that if Stiebeling's full calcium standard (which allows of 50 per cent. margin for safety) is used, only families with 45s. per head per week get enough calcium. This means to say that the diet of 90 per cent. of the population is deficient in this item. It is obvious, however, that many people live healthy lives although their diet never reaches this standard, and this is a justification for a standard which is two-thirds of that of Stiebeling. A section on food requirements and the effects of deficiencies treats a specialised aspect of the subject in a particularly picturesque way. Professor Marrack possesses the faculty of lightening his discussions by the interpolation of witty little side remarks. For instance, writing of Basal Metabolism, he states that:

An enormous number of measurements have been made of the Basal Metabolism of human beings and of animals, ranging from mice weighing $\frac{3}{4}$ oz. to a stallion weighing 1,760 lbs. Elephants do not lend themselves to this type of research.

It is such little touches as these that help the layman over the scientific styles:

Protein Requirements

In the section on protein the conflicting evidence of minimum requirements is judiciously presented. In our present situation our interest is focused on the effects of low protein intake on health, but we are not given much comfort, and no conclusions of adult requirements are to be drawn from comparisons between races that eat large amounts and those that eat small amounts of protein. The reader is left to digest the considerable amount of conflicting evidence given and to judge for himself.

The Vitamins

The subject of vitamins is along familiar lines, but Professor Marrack treats it with his characteristic "twist". On the relation between food and teeth, in a matter of two pages is crammed a large amount of information. One conclusion is come to, that the way to avoid dental decay is to eat a diet that contains abundant vitamins, especially C and D, requires chewing, and does not include many sweets.

The temptation to quote has been so great that no space is left even to mention Professor Marrack's treatment of other aspects of his subject; it would be difficult to find any that he has not touched upon in an illuminating manner.

T.C.-W.

* *Food and Planning*. By J. R. Marrack, M.D., D.S.O., M.C. Pp. 285. London, 1942. 15s. net.

The Importance of Trace Elements in Nutrition

UNTIL RECENTLY only about a dozen of the eighty or more elements known with greater or less familiarity to the inorganic chemist would have been counted as playing major parts in the composition of living tissues.

For the formation of proteins, carbohydrates and lipoids only carbon, hydrogen, oxygen, nitrogen, sulphur and phosphorus are necessary. For the formation of bones we must provide calcium, and iron is needed for red blood corpuscles. To maintain the osmotic pressure of the body fluids, potassium, sodium and chlorine would have to be admitted. For plants, magnesium, which occupies in chlorophyll a place analogous to iron in hæmoglobin, is obviously essential, and silicon would also be allowed for the stalks of plants and for some forms of marine life. All other elements would have been considered at the best as alien contaminants of the tissues; at the worst as poisons, as indeed many are.

Modern research on the "Importance of Trace Elements in Nutrition", which was the subject of a recent conference held by the Nutrition Society at the London School of Hygiene and Tropical Medicine,* has progressed in two distinct directions. In the first place, it has been found that several elements other than those listed above are necessary in minute amounts for the maintenance of health and development. Thus animals require traces of iodine, copper, manganese and zinc. Boron is necessary to plants. The second development has been the discovery that sources of "natural" fodder and drinking water may sometimes contain traces of toxic elements, which, when consumed over long periods, cause serious and even fatal diseases. Fluorine, molybdenum and selenium are included in this class.

The "trace elements" may therefore be divided into three groups: (1) Essential, (2) Toxic, (3) Inert. Unfortunately, however, from the point of view of simplicity, elements may be both essential in traces and toxic when given in somewhat larger amounts. This is certainly true of copper. With fluorine it is certain that excess is toxic to man and animal, while there is strong, but not conclusive, evidence that traces are beneficial. In the "inert" group may be included all those elements found in small amounts in the tissues for which no rôle in metabolism has yet been found, and which have not yet been demonstrated to be toxic in small amounts. It must be emphasised that great variations are to be found in the requirements of animals and plants for essential trace elements, and in their vulnerability to toxic elements.

Essential Trace Elements

Iodine may be given pride of place among trace elements, in view of our comparatively complete knowledge, due largely to the classical experiments of Marine some twenty years ago, of its specialised function in the thyroid gland.

This small orange-coloured gland, which is situated in the neck in front of the windpipe, controls the basal metabolic rate, or heat production of the body during rest. The regulation is effected by the secretion into the blood stream of the hormone thyroxine, which contains iodine in combined form. The elucidation of the chemical structure of thyroxine, and its synthesis, were achieved in the brilliant researches of Professor C. R. Harington. Dietary deficiency of iodine, which until therapeutic measures were taken occurred in well-defined localities in many parts of the world, leads to the diseases of goitre and cretinism. Moderate excess of iodine as iodide is harmless, except in a few subjects who are specially sensitive through disease or idiosyncrasy.

Copper

Copper has long been known to be a constituent of turacin, a pigment present in the feathers of a South African bird, and of hæmocyanin, a blood pigment of crabs and other crustacea. Evidence of the indispensability of copper in mammals was obtained some fifteen years ago by a group of workers at Wisconsin University. Rats which were reared on a diet consisting exclusively of cows' milk developed severe anæmia, which did not respond to treatment with pure iron salts, but which was cured by the addition of small amounts of copper. Copper deficiency has also been found to be responsible for the development of enzootic ataxia in lambs. Known locally as "warfa" or "swayback", this disease has until recently been a source of great loss to farmers in certain districts of Derbyshire. It is also known in Australia. Young lambs suffer from paralysis of the hind legs, which causes the hind quarters to wobble from side to side when it attempts to walk. Death often occurs from starvation, due to failure of the lamb to keep up with the mother, and post-mortem examination reveals atrophy of the motor centres of the brain. An effective means of preventing the malady has been found in the provision of salt licks containing 0.5 per cent. of copper sulphate. Recently some progress has been made towards an understanding of the function of copper by the isolation by the Cambridge workers Keilin and Mann of two blue-coloured copper compounds, hæmocuprein and hepatocuprein, from mammalian blood and liver respectively. The enzyme responsible for the blackening of raw potatoes has also been found to be a copper-protein complex.

Cobalt

Cobalt deficiency leads to a condition known as "pining" in sheep, which fail to thrive and become straggle-haired and miserable in appearance. The disease was mentioned as long ago as 1831 by the Scottish poet James Hogg, the "Ettrick Shepherd", who decided correctly that the cause was dietary and not infectious. Later it became clear that the fault may be traced to some deficiency in the soil. Thus in the Isle

* This article is based mainly, but not exclusively, on data given in papers read at the conference.

of Tiree, off the west coast of Scotland, a tract of white sandy soil is sharply divided from a tract of heavy peat. Sheep grazing on the former were found by Dr. J. Russell Greig to develop "pining", whereas those kept on the heavier land remained healthy. A similar condition, endemic in parts of Australia, known as enzootic marasmus, caused considerable trouble to breeders of both cattle and sheep. Both these conditions, as well as "coast disease" in Australia and "bush disease" in New Zealand, were found to respond to treatment with crude, but not with purified, iron salts. Research in Australia indicated that the missing metal is cobalt, as little as 0.1 mg. per day being an adequate dose for sheep, and 1 mg. for cows. In "coast disease" a secondary deficiency of copper is superimposed. According to Dr. Lyle Stewart, "pining" sheep are particularly susceptible to infestation with worms, and should be treated with both minerals and anthelmintics.

Manganese

Manganese was found by Orent and McCollum in America to be essential for lactation in rats. The caption "Manganese is mother-love", which appeared in the popular press is, however, less appropriate than might at first sight appear, since lactation is adversely affected by lack of almost any essential dietary factor. Delayed ovulation in farm animals and "slipped tendons" in chicks have been ascribed to manganese deficiency.

Zinc

Zinc deficiency has not yet been found to be responsible for any natural disease, but twenty years ago the French worker Bertrand and others claimed to have demonstrated the indispensability of this element by means of experiments with laboratory animals. Although at the time the evidence produced did not appear quite conclusive, Keilin and Mann have recently found an important rôle for zinc in metabolism as a component, in combination with protein, of the enzyme "carbonic anhydrase". This enzyme accelerates the release of carbon dioxide from carbonic acid, and is essential for the efficient elimination of carbon dioxide from the lungs and for the correct acid base balance of the organism.

Boron is essential for plants, and probably plays some part in the fixation of nitrogen by the root nodules of leguminosæ.

Toxic Trace Elements

It has been mentioned that deficiency of one member of the halogen group, iodine, has resulted in serious disease among humans in certain parts of the world. It is remarkable that similarly localised disease should be associated with fluorine, another element of the same group, but in this case excess, rather than deficiency, is the cause of the trouble.

Poisoning by fluorine may occur in two distinct ways: (1) through geological conditions giving rise to supplies of drinking water of high fluorine content, or (2) through undue exposure to fluorine in the course of industrial processes. The incidence of fluorosis in Maldon, Essex, where until recently the water supply contained 5 p.p.m. of fluorine, may be cited as the most impressive example of fluorosis arising from geological

causes, although the condition has been reported in many other areas. The most obvious effect is seen in the teeth, which during growth become mottled with opaque white patches, sometimes with brown stainings. The mottled teeth seem particularly resistant to decay. Much more serious fluorine intoxication is known in South India. In adults the most striking effect is on the bones, which take up large amounts of fluorine until finally the spinal column becomes set stiff as an immovable pillar. The bone lesions are accompanied by extreme emaciation, and death intervenes through intercurrent disease. It is remarkable that natives of Northern India, in districts where the fluorine content of the water is equally high, but where the general diet is much superior, do not develop fluorosis. Susceptibility to fluorosis, therefore, seems to be increased by deficiency of other nutrients. Radiological examination of a group of English children by Dr. F. H. Kemp has indicated that slight interference with the normal course of ossification of the spine is relatively frequent. The malformation is often associated with mottling of the teeth, but there is no evidence that fluorine alone is responsible.

Fluorosis from industrial causes occurs among workers handling fluorspar or cryolite. The bones are affected more than the teeth. Industrial fluorosis in animals has presented a problem to farmers with land in the vicinity of brickworks. Large collections of kilns may contaminate the ground with fluorine to the distance of one mile on the windward side. Cattle are most severely affected. The lesions are confined to the bones, which may accumulate 16,000 p.p.m. of fluorine, and teeth. Superficially the main changes are to be seen in the hoofs and lower parts of the legs, which are greatly thickened, with pain and lameness. Another change is noticed in the shape of the skull, which, in the words of the farmer, gives the cow "an old-fashioned look".

Fluorine in small amounts is a normal constituent of healthy bones and teeth, and there is some evidence that amounts of up to 1 p.p.m. in the drinking water are beneficial in preventing dental decay.

Selenium

For many years livestock producers in certain localities of South Dakota complained of unsatisfactory growth and reproduction in their animals. Madison, of the U.S. Army, noted a severe illness in cavalry horses kept in this region as early as 1857. The cause of the poisoning was traced to selenium by Franke in 1928. Experimental rats invariably died sooner or later when given grain which had been grown on seleniferous soil. In animals which survived for prolonged periods before death the most striking feature was severe injury to the liver, but the heart, spleen and bones were also affected. The selenium was found to be combined with protein in maize, wheat, barley or emmer. Identical lesions could be produced in rats by giving inorganic selenium. Selenium adversely affected the hatchability of eggs, and its injection into eggs during incubation led to the production of monsters.

Molybdenum

Molybdenum in excessive amounts in the soil is the cause of "teart" in grazing animals, which has long been known in the Lower Lias region of Somerset, in

certain districts in Holland and elsewhere. The principal symptoms are scouring and deterioration of the coat. The molybdenum content of herbage may be estimated spectroscopically after ashing, and has been found to be much greater for "teart" pastures than for wholesome pastures, which are often found side by side. The grass is most poisonous at the time of maximum growth, and hay made from it is less toxic as the result of reduced solubility of the molybdenum. Since "teart" is confined to ruminants, it seems probable that molybdenum adversely affects the symbiotic bacteria of the rumen. "Teart" may be prevented by giving the ground a top-dressing of copper sulphate, but the reason for the beneficial action of this treatment is still obscure.

Trace Elements in Food Manufacture

Much of the valuable fund of information made available by recent research on trace elements may seem at first sight to have little bearing on the immediate practical interests of the food manufacturer. It is important, however, that the potentialities of "trace elements", either for good or for evil, should be fully realised, and for this reason some knowledge of what may be called the "trace element diseases" is highly desirable. As medical progress dictates, the manufacturer may at any time be called upon either artificially to fortify his product with an essential element, or to ensure that it does not become contaminated with a toxic element. A start has been made in the first direction by the inclusion of iodine in some brands of table salt. Moreover, the question of the fortification of the national loaf with the common elements calcium and iron has already been the subject of official discussion. If iron is to be added, the next step might be to consider whether a pure or impure source of this element is preferable, and whether plans should be made to include minute, but carefully standardised, amounts of cobalt, copper and manganese.

Biological Effects of Metals

In regard to toxic "trace elements", the food manufacturer has to face his own particular problems concerning the effects on foodstuffs of contact with the metallic parts of industrial plant and of storage in metal containers. More complete information on the biological effects of industrial metals, particularly tin, seems greatly needed. As the science of food technology advances we may hope that eventually the scale of legal limits for toxic elements in processed foods will be based on pharmacological tests rather than on arbitrary chemical values. Under the present system fresh oysters and flat-fish may contain more arsenic than is legally permitted in processed foods. Wheat may contain enough lead to be dangerous if it were not present in an insoluble form. While the manufacturer must be ever-watchful against the possibility of innovations in material or technique, leading either to the inclusion of toxic metals in his product or to its deterioration through contact with metals, he should not be subjected to any unnecessary restrictions.

Copper Pre-eminent among Harmful Metals

At the present state of our knowledge copper seems to be pre-eminent among the trace elements in its potentiality for causing deterioration in food values

during processing. Although, judging from the experiments with animals which have been mentioned above, this metal is physiologically indispensable, an ill-advised attempt by the manufacturer to improve his product by its inclusion might court disaster. The danger lies in the remarkable powers of copper in promoting oxidation. Thus in processing vegetables the introduction of copper salts, or even the use of a copper vessel, may be expected to cause severe, or even total, loss of vitamin C. In fact, traces of copper will promote rancidity. As far as possible, therefore, copper vessels or stirrers should be avoided in processing food.

Rabbit Meat in Eire

THE demand from Great Britain for rabbit meat and skins has created a thriving industry in Southern Ireland. Trappers receive 2s. 6d. each, the market price for local consumption or shipment to England. The rabbits are obtained by exporters direct from trappers, indirectly from village markets and from farmers to whom trappers have sold their catch. Buyers in some respects are in competition with exporters, although, after disposing of the meat to their customers, they pass on the skins to them, for which they receive 8d. to 1s.

Before the war rabbits were generally regarded by the farmers in Eire as pests on account of their large numbers and crop-destroying propensities. Extermination by gas or other means was advocated. To keep them under control a bounty was paid to expand the catch and increase exports. This quasi plague has now been turned to advantage, as the trade in meat and skins has grown apace. Three methods of catching are used—wire traps, netting, and dazzling the rabbits with acetylene lights after they are driven out of the ground by ferrets and dogs at night.

During 1940 about 1,500,000 carcasses were collected from farmers and trappers by central agents and sent to the factories at two or three shipping points, principally Dublin and Cork. Up to the middle of 1941 anyone could export dead rabbits and skins in any condition to buyers in the United Kingdom, mostly poultry dealers. Roughly 80 per cent. were sent as meat without skins, and the remainder with fur on them.

At the factory rabbits were skinned, dressed and thoroughly examined. There is less disease in rabbits than in poultry. Of the 250,000 examined by one firm last year 400 were diseased; none was then found to be defective by this particular trapper up to date. On the other hand, rabbit is extremely perishable. Up to two years ago there was considerable prejudice against the meat, due in some measure to its cheapness. Now packers state that it is in demand by the best hotels.

Carcasses are packed for export in cases of 60 lbs.—30 to 32 rabbits. These are immediately sent to a refrigeration plant; so no time is given for blood to rise to the surface. This ensures a pink flesh, which, if a milder process were used, would become dark. About 25,000 such cases were shipped to the United Kingdom in 1941. The wholesale and retail prices of skinned rabbits were about 10½d. and 1s. 1d. per lb. respectively. The average weight is 2 to 2½ lbs.

Last year the British Government decided to control

imports through the Wholesale Poultry Association, under the Ministry of Food. Many members of the Association were already handling rabbits when this new Regulation was introduced. Supplies from Ireland were divided between members of the Association on the basis of the quantities they imported September, 1938, to September, 1939. The Poultry Association then arranged with the Eire Government to import from one source only, when all exports to Great Britain should pass through the hands of a company called Eggsports.

Principal grades of rabbit skins are "full-winters", "half-wilds", "first-racks", "second-racks", "suckers", and "mites". In Belgium and some other places these categories are subdivided. Incidentally, the Canadian pelt, fluffy and snow white, is well regarded. Rabbits begin moulting in the spring, and until early autumn the skins are of little value. There is also loss in summer as carcasses are so perishable when exposed to heat. For these reasons, from May 1 to September 1 has been declared by the Government a closed season for killing.

In pre-war times skins were dressed in Ireland. At present this cannot be done to any extent as the necessary sulphuric acid, bichromate of potash, sulphate of copper, soda ash and dyes are not available. An effort is to be made, however, for the partial preparation of pelts by a group of firms known as the Rabbit Development Co. The hair to be used for hat felts is to be shaved off the skins and cleaned. And good quality pelts and shaven skins will be semi-dressed. Others will be made into gelatine, while offals will provide fertiliser.

At present pelts are shipped unprepared to the United Kingdom, where the best are tanned and dyed in imitation of such furs as seal, musquash and beaver for making coats and dress and hat trimmings. Some better-grade skins are tanned for glove-making; others are used by manufacturers of artificial silk, to line certain specialised machinery, for manes and tails of toy animals, and for such toys as Teddy bears and dogs. A white gelatine, suitable for use by confectioners, is obtained by cutting skins into fine strips and submitting them to a boiling process.

Calcium in Bread

FOLLOWING upon his articles in the *Lancet* and other places, Dr. I. Harris has recently collected in a small book* his considered opinions on the addition of calcium to the national loaf.

The main points of Dr. Harris's thesis are:

1. That many people will have their span of life shortened by the calcium added to bread.
2. That the committee which dealt with the matter was not competent to do so.
3. That Dr. Harris has never seen one example of calcium deficiency.
4. That the contention that the lack of calcium is the cause of bad teeth and brittle bones (osteoporosis) is not true.
5. That the present figures for calcium requirements are not of the slightest scientific value.
6. That calcium is the one substance which is available in abundance in natural foods and water.
7. That the kidneys suffer overstrain from an excess of calcium can be demonstrated with mathematical precision.
8. That the bulk of medical opinion in this country is against it.
9. That there are no reasons for adding calcium to bread.

"The Phytic Acid Myth"

In a chapter headed "The Phytic Acid Myth", Dr. Harris comments on a recent paper by McCance and Widdowson as follows:

It has been stated that an investigation embodied in a recent paper by McCance and Widdowson (*Journal of Physiology*, Vol. 101, No. 1) has placed the proposal to add calcium to bread on a firm scientific foundation. Let us see.

The number of molecules and ions in the blood stream

* *The Calcium Bread Scandal*. By Dr. I. Harris. Pp. 23. 1s. net.

varies but little within narrow limits. If at a given time a particular substance is absorbed in greater quantity than before, it will displace in part some other substance in the circulation. In an experiment of ours a large amount of inorganic bases was administered to a subject, in consequence of which the blood protein (and very likely the tissue protein) became lower, and the end product of protein metabolism excreted was correspondingly larger (*Journal of Physiology*, 1941, Vol. 99, No. 3, p. 370).

Dr. McCance and his co-worker found that calcium in brown bread is not absorbed to the same extent as in white. But they found that other substances which brown bread contains in larger quantities than white behave in the same way—potassium, for example. They, however, attribute the increased amount of potassium in the faeces to "the indigestible nature of the branny particles or to their laxative action". Why not attribute faecal calcium to the same cause?

Calcium in White Bread

The amount of calcium in white bread is 18.5 mg./100 gm.; in 92 per cent. flour, 34.8 mg./100 gm. The amount of phosphorus in white bread is 83 mg./100 gm., but in wholemeal bread it is 287 mg./100 gm. It will be seen that the phosphorus ration in brown bread in relation to white is much greater than that of calcium in the two breads.

According to the principle enunciated we must expect that the amount of phosphorus absorbed in brown bread will be relatively greater than calcium. This is actually what happened in all the experiments. As the amount of phosphorus absorbed under brown bread diet is greater than under white, we may take it that part of the calcium in the circulation and tissues was displaced by phosphorus.

The same applies to phytic acid. The latter was added to white bread as phytic acid phosphorus. In

this instance, too, there was a much larger absorption of phosphorus in the white bread to which phytic acid was added than in the untreated white loaf. Here, again, all that happened was that part of the calcium in the body was replaced by phosphorus.

In a number of cases under phytic acid there was actually more calcium in the faeces than was contained in the food. From whence did this extra calcium come? I can answer this question. The amount of calcium which phosphorus has displaced in the system was excreted via the bowels. (Calcium is excreted via the bowels.)

The experiments also show that when an extra amount of calcium was added to brown bread the absorption of phosphorus became less and there was correspondingly an increase in absorption of calcium. Clearly there is nothing at all new in these experiments. They simply demonstrate what has been known for a long time: that there is a reciprocal relation between phosphorus and calcium. If the concentration of one increases, that of the other diminishes. So far as these experiments are concerned, phytic acid is merely a figment of the imagination.

Calcium Balances

And now for the balances. In one instance a calcium intake of 1,470 mg. per day still showed a negative balance. The authors attribute this result to the presence of phytic acid in brown bread. But in our book, *High Blood Pressures* (London), similar instances will be found where phytic acid is not a consideration at all.

A case of ours was put on high protein for a period. In such a condition the amount of protein in the system is usually raised; the amount of calcium, part of which is bound to protein, is also raised. After an interval this case was put on low protein diet. The "internal requirement" of calcium became less, and under an intake of 0.89 gm. per day of calcium there was a negative calcium balance. All that happened in this case was that the amount of calcium no longer required was excreted.

The large negative calcium balance under brown bread is simply due to the fact that the calcium displaced by phosphorus in the system is excreted via the bowels. I have repeatedly stated that calcium balances cannot be used as a criterion for requirements.

A Challenge

Finally, it would appear from the paper by these authors that the present calcium intake is less than pre-war. I would like to challenge them to produce figures to this effect. An investigation published by the *Lancet* quite a long time ago showed actually an increase of calcium in a series of cases from 0.63 gm. pre-war to 0.77 gm. wartime.

British Material for Export

Overseas readers are advised that the fact that goods made of raw materials in short supply owing to war conditions are advertised in **FOOD MANUFACTURE** should not be taken as an indication that they are necessarily available for export.

Examination of Raw Sugar

In examining samples of raw sugars by the latest research methods, advantage is taken of the improved combined cine-micro-camera which makes it possible to take a fully detailed record of the micro-organisms and sugar lice.

The taking of photo-micrographs in the ordinary way is complicated by the fact that the wriggling mass moves so rapidly, and the emulsion on photographic plates is not sufficiently rapid where the light has been restricted by the power of magnification employed. Most of the simpler examinations consist of dissolving some of the suspected sugar sample in water, allowing the turbid solution to settle, whereby dirt is allowed to deposit, and a fine scum rises to the surface, which later is inspected on a glass slide under the ordinary microscope. A better plan is to have rings or sections of glass tubes cut off, into which the scum is fed, and which are held to the glass slide with the assistance of some plastic medium such as "Plasticine".

By so doing, a larger field of definite depth is obtained which facilitates focusing. Even where "still" photo-micrographs are wanted, it is simpler to acquire this from cut-up cine-films, from which a large variety is available for choice, and which are duly enlarged, developed, and printed. Reflected light is directly passed through the glass slide, and the narrow depth limits the extent to which the live matter can pass out of focus, which would otherwise render cine-photo-micrography complicated.

When undertaking this work for the first time, it is considered advisable to deal with selected raw sugar solutions which are known to contain dirt in varying qualities, particularly from cane fibres, which are known to contain appreciable tropical and sub-tropical matter.

All practical features such as accurate focusing, and light values for the speed of film used to acquire sharp detail and good rendering are thus easily obtained. It is then less complicated to substitute solutions from reclaimed sugar and ascertain what animal life, if any, is present without delay. The variety is considerable, and has been described by sugar research workers as something in the nature of a museum, including what are termed insects, animals and reptiles. Sugar possesses many valuable qualities, but with the desire to meet a popular demand, it is known that odd lots have been utilised to confer the necessary sweetening properties, which had been housed in not too hygienic conditions, and which could with advantage have been examined by the foregoing method. When preparing the sugar solution, it is important to see that the water used has a temperature not exceeding 15° C. Most cine-micro-cameras are equipped with an independent ocular so that the operator can view what is being photographed throughout, but, despite this, it is a good plan to retain the glass-slide arrangement and apparatus in position while the film is being developed and reversed, so that, on projection, should any section appear defective, a reliable repeat film can be acquired.

A. G. AREND.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, January 1, page 24.

No.	Date. 1942.	PRICE FIXATION ORDERS	No.	Date. 1942.	FISH
1562	Aug. 1.	Eggs (Control and Prices) (Great Britain). Revokes S.R. & O. 1941 Nos. 1666, 1935, and 2039 and 1942 Nos. 275 and 478.	2102	Oct. 9.	Amending the Immature Sea - Fish Order, 1942
1586	" 6.	Home-Grown Dredge Corn (Control and Maximum Prices) (Northern Ireland). Further provisions contained in S.R. & O. 1942 No. 1555. See Wheat (List, July, 1942). Revokes S.R. & O. 1940 No. 1631 in so far as it relates to Northern Ireland.	2187	" 24.	Fish and Fish Products (Control of Packing) Order. Revokes S.R. & O. 1941 Nos. 975 and 2040.
1590	" 6.	Amending the Home-Grown Apples (Maximum Prices) Order, 1942.	2273	Nov. 4.	Amending the Fish (Port Allocation Committee) Order, 1942.
1635	" 13.	Amending the Biscuits (Licensing and Control) Order, 1941.			
1636	" 13.	Amending the Biscuits (Maximum Retail Prices) Order, 1942.			
1637	" 13.	Amending the Carrots (1942 Crop) (Control and Prices) Order, 1942.			
1642	" 14.	Directions, under the Potatoes (1942 Crop) (Control and Prices) Order, 1942.			
1646	" 15.	Amending the Home-Grown Tomatoes (Maximum Prices) Order, 1942.			
1648	" 15.	Amending the Meat (Maximum Retail Prices) (Northern Ireland) Order, 1940.			
CANNING OF FOOD AND FEEDING STUFFS (CONTROL)					
2186	Oct. 24.	Order.			
CONTROL COMMITTEES					
2132	Oct. 16.	Order, amending the Food Control Committees (Constitution) Order, 1942.			
FEEDING STUFFS					
2031	Oct. 1.	Feeding Stuffs (Regulation of Manufacture) Order. Revokes S.R. & O. 1940 Nos. 1119, 1748 and 2005; 1941 Nos. 270, 994, 1651 and 1934; 1942 Nos. 290, 609, 1501, 1649 and 1753; and 1941 No. 1332 in so far as it relates to Great Britain.			
2056	" 1.	General Licence, under the Feeding Stuffs (Regulation of Manufacture) Order, 1942. Revokes S.R. & O. 1941 No. 1333 in so far as it relates to Great Britain.			
					GENERAL
			1474	July 25.	Butter, Margarine and Cooking Fats (Rationing).
			1475	" 25.	Cheese (Rationing).
			1477	" 25.	Preserves (Rationing).
			1478	" 25.	Sugar (Rationing).
			1479	" 25.	Tea (Rationing).
			1482	" 25.	Registration of Consumers.
			1484	" 25.	Dripping and Edible Oils (Control of Sales). Revokes S.R. & O. 1940 No. 926.
			1494	" 29.	Amending the Meals in Establishments Order, 1942.
			1500	" 31.	Emergency Retail Stocks. Rationing
					MANUFACTURED AND PRE-PACKED FOODS
			2073	Oct. 6.	Amending the Manufactured and Pre-Packed Foods (Control) Order, 1942, and Appointing Days Thereunder.
					MILK
			2061	Oct. 3.	Milk (Scheme of Supply) Order. Revokes S.R. & O. 1941 No. 1604.
			2285/S57	Nov. 5.	Milk (Control of Supplies) (Scotland) Order.
			2286	Nov. 5.	Amending the Milk (Control of Supplies) Order, 1942.
			2349	" 14.	Milk (Retail Prices) (Northern Ireland) Order. Revokes S.R. & O. 1940 No. 1715 and 1941 No. 119.
					POINTS RATIONING
			2050	Oct. 2.	Amending the Food (Points Rationing) (No. 2) Order, 1942.
			2134	" 16.	Amending the Rationing (Personal Points) Order, 1942.
			2135	" 16.	Amending the Food (Points Rationing) (No. 2) Order, 1942.
					RESTAURANTS
			2300	Nov. 7.	Directions, under the Meals in Establishments Order, 1942.

News from the Industry

Director of Fuel Supplies

In view of the fuel economy campaign, the Ministry of Food has appointed Mr. F. B. Kerridge to be Director of Fuel Supplies, with responsibility for allocating available supplies of fuel to the food industry, and for ensuring the utmost economy in its consumption. Mr. Kerridge was formerly an assistant inspector in the Armaments Branch of the Ministry of Supply, and before that was one of His Majesty's Inspectors of Mines.

National Bread

The Ministry of Food has issued the following hints on bread-making:

(1) National bread requires more baking than bread made from white flour. 2-lb. loaves should be in the oven at least 50 to 55 minutes. In making tin or pan bread do not place the pans too close together. Give the oven time to recover its heat before setting the next batch.

(2) Do not have the dough too tight or too slack. The water absorption of wheatmeal varies somewhat, but 16 gallons per sack should be about right.

(3) Avoid under-fermented doughs. Use plenty of yeast, and 5 ozs. of salt per gallon of water.

(4) Cool your bread quickly and thoroughly, and follow the hints on "rope" prevention which were sent to you in June.

Dried Pork Early this Year

The first contract for dehydrated pork for shipment overseas has been awarded by the U.S.A. Agricultural Marketing Administration, which makes all Lend-Lease food purchases, reports Reuter.

At least ten factories, chiefly in the Mid-West, will be producing dehydrated pork by early this year.

Dairy products, vegetables and fruits have been sent to Britain and other countries in dehydrated form, to save shipping space, for some time.

February, 1943

Britain Buying 800,000 Tons of Argentine Meat

Britain has arranged to buy 800,000 tons of meat from Argentina during the fourth year of the war.

Delay in the conclusion of a new meat agreement between Britain and Argentina is due to the cattle owners' demand for an increase in price, it is understood in Buenos Aires.—*Reuter*.

Sir Bryce Chudleigh Burt

Sir Bryce Chudleigh Burt, C.I.E., M.B.E., who died on January 1 at Colwyn Bay, had been Director of Animal Feeding Stuffs under the Ministry of Food since September, 1939.

He was born at Newark-on-Trent in 1881, and educated at University College, London, where he took high scientific honours. He held lectureships in chemistry at Liverpool and in Trinidad before being appointed to the Indian Agricultural Service. In India he held several important posts, being secretary to the Indian Central Cotton Committee for several years. Afterwards he was vice-chairman of the Imperial Council of Agricultural Research. He was knighted in 1936.

New Zealand Agar-Agar

Enough agar seaweed to supply British hospitals' requirements for a year has already resulted from collections made in New Zealand since the Japanese supply of this essential drug dried up.

A commercial firm in Auckland plans to install plant to treat it, while its systematic collection has been undertaken by the Marketing Department.

Research work shows that the New Zealand agar is of very high quality—twice as good as the Japanese in all essential characteristics.

Perth Bull Sold for £3,000

Calrossie Cavalcade, Perth-bred prize-winning shorthorn bull, has been sold in Buenos Aires for 51,000 pesos (about £8,000).

Sir W. Arbuthnot Lane, Bt., C.B.

As FOOD MANUFACTURE was going to press we learned with regret of the death of Sir William Arbuthnot Lane, the eminent surgeon and health specialist.

An obituary will be published in the next issue.

British Wheat Arrives in Persia

The first consignment of British wheat recently arrived in Teheran in lorries draped with the Union Jack.

Before cheering crowds it was put into Persian lorries on which had been painted the words, "Britain brings wheat to Persia."

Earlier in the day aircraft of the Persian Air Force had flown over the capital and dropped leaflets recalling the Anglo-American promise to send wheat to Persia.

The Axis-inspired bread riots have now completely subsided; shops are prohibited from closing, and order reigns throughout the city.

Gold Coast Honey

Production of honey is becoming a new industry on the Gold Coast on account of a large demand from British Forces.

It is expected that by May of this year the yield will be at least 1,000 lbs. monthly. A special appeal has been made to tribal chiefs to intensify the collection after February.

This new industry, which is receiving Government support, is expected to continue after the war. By-products include beeswax, which is used in the production of aeroplanes, guns, tanks and shells.

"FOOD MANUFACTURE" 1942 INDEX

THE 1942 Index of FOOD MANUFACTURE is ready and is available to subscribers on receipt of a stamped addressed envelope, which should be 10 ins. by 8 ins. to avoid undue folding of the Index.

Chart for Fire Guards

To assist in the urgent task of training Fire Guards Jordan and Sons have issued *The Fire Guard's Pocket Chart*, by T. M. Ross; 4d. each (by post 5d.), 30s. 100 (by post 30s. 6d.).

Information essential to Fire Guards is presented by means of pictures, diagrams and tables, in a manner that will facilitate training and make revision easy.

* * *

Metafiltration

In everyday use where the processing of liquids calls for perfect filtration are Metafilters, one of their principal applications being the purification of water for the Forces. Since the outbreak of hostilities new applications too numerous to mention have arisen, many of which relate to the preparation of food products and in kindred trades.

Among these can be quoted the filtration of National Rose Hip Syrup. Treatment by the Metafilter produces a starbright syrup which renders it more palatable, and being devoid of cloudy suspension makes it more attractive to the eye of a child.

Another interesting application is the filtration of the special varnishes which are now being used by the canning industry for coating the internal surfaces of containers instead of tinning, now that tin is at a premium.

The manufacturers of this method of treatment, the Metafiltration Co., Ltd., put through filtration tests on samples of materials sent in by prospective users.

* * *

A Stabilising Agent

A pure vegetable stabilising agent for use in the production of food products is "Hydragum" (Schisagum), marketed by Brown and Forth, Ltd. It is not in any sense a substitute for other thickening agents, but a pure natural product of the very highest quality. Hydragum gives mucilage of greater viscosity than any other known gum at the same strength. It is odourless, tasteless, free from insoluble matters and has colloidal properties which enable it to act as a stabiliser. It is recommended as the thickening agent for sauces, pickles, ketchups, mayonnaise, etc., and for pastry fillings and many other purposes where a thickening and stabilising agent is needed. Hydragum is being extensively used in lieu of agar-agar and gum tragacanth.

* * *

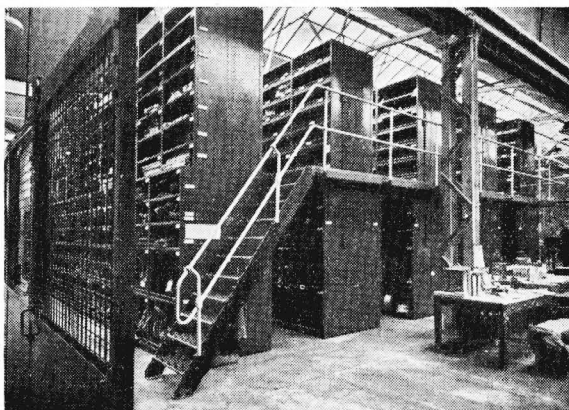
Factory Shelving

The exigencies of war compel the utmost use of space in every factory. In many cases, where floor space is already fully occupied, storage presents a seemingly insuperable difficulty, often creating a "bottle neck" in production.

"Adjusteel" Shelving, made by Constructors, Ltd., is the solution of this problem. High, compact and efficient racks and bins can be built upwards in single or multiple tiers, enormously increasing storage capacity without encroaching on floor space. This applies to existing as well as new installations.

A typical example is illustrated here, and demonstrates maximum storage capacity in minimum space.

This compact installation facilitates orderliness and speed in the issue of stores, with a resulting saving of time and increased efficiency, while the economy of floor space will be fully realised by all concerned with works planning.



Ch. Goldrei, Foucard and Son

The well-known firm of Ch. Goldrei, Foucard and Son was incorporated into a private limited company (capital £200,000) on December 31, 1942. The policy and managerial personnel remain unchanged.

The directors are: Ch. Goldrei (Chairman and Managing Director); J. Valentine Backes A.R.C.Sc., A.I.C. (General Manager); B. M. Goldrei; L. H. Goldrei; J. F. Owen; V. H. Liddell; N. A. Foucard; H. E. Hollands (Secretary).

The registered offices of the company are 63-69, Llewellyn Street, London, S.E. 16.

* * *

Workmen's Compensation

A memorandum issued by the Accident Offices Association sets out the benefits under the Workmen's Compensation Act. This is followed by criticisms and comments on the present system. Workmen's compensation insurance is discussed, especially from the angle of private enterprise. The case of the U.S.A. is mentioned, where State insurance is in competition with private insurance and where the latter is generally preferred. The preference for private enterprise affords, states the memorandum, a continuous striving after improved administration and service and reduction of expenses. This little publication gives a clear and concise account of the different angles of workmen's compensation.

* * *

Barnett and Foster, Ltd.

Messrs. Barnett and Foster, Ltd., essence distillers and bottling engineers, inform us that their representatives, now being in the Forces or assisting in their factory and offices, are not able to call, which means that the personal contact between the firm and its customers has, for the time being, had to be interrupted.

Meanwhile, customers' interests will be looked after direct from Head Office, and the firm has been able to maintain its service and prompt delivery in spite of the fact that a large number of the pre-war employees are now serving in the Forces.

Self-Winding Hose Wheels

In using rubber or canvas hose for cleaning out pans and other equipment, washing of vegetables and fruit, as well as general washing down, and similar purposes, the usual practice is to have long lengths of hose which lie about on the floor, subjected to severe wear and tear, not only by contact with oil and other deleterious products, for example, but also because of accidental damage, such as being trodden upon and run over by trucks and barrows, whilst kinking and abrasion are also apt to result.

The "Wayne" self-winding hose reel, a production of Power House Components, Ltd., will overcome these difficulties, and consists in general of a reel on which the hose winds or unwinds, having a spring mechanism in an enclosed casing, on the same principle as the spring roller blind. By this means no trailing of long loose lengths is necessary, and the life is enormously increased because of the almost complete elimination of the accidental and other damage already mentioned.

A New Packaging Material

A British packaging material called "Textuff" is of interest, especially at the present time. It consists of purely vegetable material, and is claimed to be not only thoroughly hygienic, but also germproof, odourless, tasteless, greaseproof and impervious to dust and dirt. Perishable foodstuffs and other commodities cannot suffer contamination by coming into contact with it, but are protected and preserved from contamination by being wrapped in it.

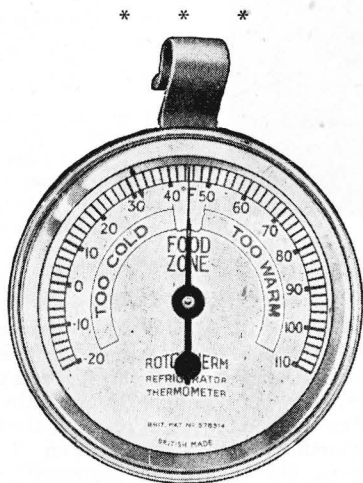
Special tests applied in the transport and cold storage of meat, butter and other foodstuffs packed in this material have given satisfactory results.

The product is manufactured in a variety of thicknesses from prepared woven and other cloths of various types, which are impregnated with a cellulose solution by a patented process, thereby producing a fabric of unique flexibility and strength which is able to withstand severe handling during shipping and storage, and can be used for a large number of purposes.

February, 1943

Its special strength and durable substance prevent its deterioration. Moist and dry heats applied to 200° F. for many hours at a stretch do not weaken the tissues, and boiling fats at 360° F. poured into containers and allowed to set show no penetration for long periods of time.

The product has many other excellent qualities and is made by Textuff, Ltd.



Refrigerator Thermometers

For refrigerator, ice chest and similar work the British Rotherm Co., Ltd., have available two very interesting and convenient types of their bi-metallic dial thermometers. One of these for industrial application is fixed in the door of the refrigerator or ice chest, with a flange 3½ inches overall diameter, having a dial about 2 inches diameter, and a pointer, giving a temperature range of 20° to 80° F. subdivided into 60 divisions.

The principle of these dial thermometers, available in a wide variety of sizes and types, within the temperature range of about minus 60° F. to plus 1,050° F., consists in utilising the expansion and contraction of a bi-metal nickel iron alloy strip made into a short and sturdy close, unbroken, multi-helical coil—that is, with one coil inside the other, being of slightly different diameter and alternately opposite "pitch".

Electrical Control of Humidity and Temperature

Automatic electrical control of humidity on the wet bulb prin-

ciple is now possible by using two adjustable type contact thermometers—the dry bulb thermometer through a relay controls the pre-set temperature, the wet bulb thermometer similarly the humidity. Instead of the heaters the relays can work magnetically operated steam valves. These controllers have the advantage of great simplicity and accuracy. The contact between mercury and adjustable electrode in the thermometer directly operates the relay, no mechanical parts therefore being required. Regulators on the same principle are available for the control of temperature only within a range of from -30° C. to approx. +400° C. The setting is done by means of a magnet, which can be detached, thereby making the instrument completely foolproof. The relays used are mercury relays up to 4.5 kw. switching capacity. These are equipped with a special protective resistance for the thermometer contacts to avoid arcing. They can stand up to a high number of operations per hour continually day and night. For special cases microwatt relays on an entirely new G.P.O. approved principle are available. These relays have practically no moving parts, the electro-magnetic field directly operating the contacts by repulsion. The foregoing equipment is manufactured by Electro Methods, Ltd.

Lieut.-Colonel Harding, D.S.O.

Lieut.-Colonel Harding, D.S.O., retired from the Board of Directors of Maconochie Bros., Ltd., on December 30, 1942.

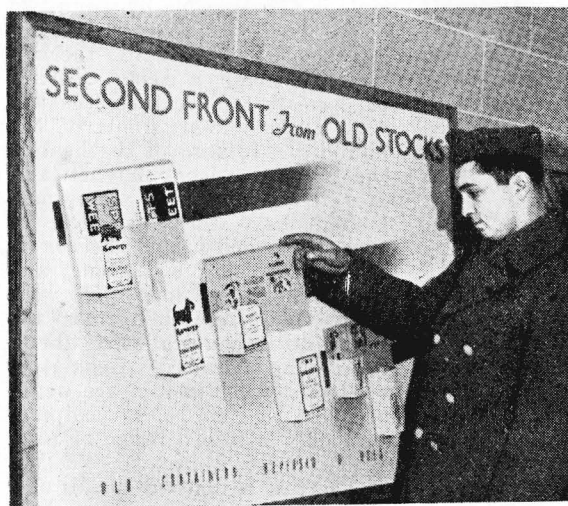
Pasteurised Milk

Mr. Cleveland Fyfe, secretary of the National Farmers' Union, said at Chester recently that the Union would resolutely fight compulsory pasteurisation of milk.

Behind the group urging compulsion, he added, was one objective—to extinguish the producer-retailer.

Change of Address

Dibb Brothers and Company have removed to 165, High Street, Hull.



Utilising old containers in reverse. One of the latest additions to the "Paper in Battledress" Exhibition. An American soldier displays great interest in the new paper economy methods for packing dog food.

(Courtesy of Ford Motor Car, Ltd., and Waste Paper Recovery Association.)

Canned Pea Labels

"The most vigorous and cheerful dissenting opinion we have come across lately was on the label of a can of peas," comments *The New Yorker*. "The peas were packed in Minnesota and the label bore this damning blurb from the Bureau of Standards: Below Standard in Quality. Artificially Coloured. To this insulting remark the manufacturer replied, in capital letters: *Above legend mandatory. Peas actually very high quality.* A great country, ours—two sides to every can of peas."

* * *

Law of Food, Drugs and Cosmetics

There has recently been published in the U.S.A. a comprehensive and authoritative work covering the far-reaching laws regulating the manufacture, distribution, advertising and sale of food, drugs, cosmetics and soaps in the United States. It analyses, annotates and explains the Federal Food, Drug and Cosmetic Act of 1938 and related regulatory statutes, State and Federal.

* * *

Davies Bottled Fruits

Shareholders of Davies Bottled Fruits at a recent meeting passed a resolution that the company be wound up voluntarily.

Wm. P. Hartley, preserve manufacturers, has acquired the company's assets.

Commercial Electric Refrigeration Association

C.E.R.A., as the appropriate body in the Commercial Electric Refrigeration Industry, was recently approached by the Ministry of Food with a request that immediate steps be taken to secure the maximum economy in the use of petrol and rubber in relation to the servicing of commercial plants throughout the country, to the complete avoidance of overlapping journeys by road which statistics showed to be taking place almost everywhere, particularly in the North and Midland areas.

C.E.R.A. immediately took the initiative by conferring with the service agents themselves to ascertain what could be done, and four representative area meetings were held in Manchester, Leeds, Birmingham and London (November 3, 4, 5 and 19, respectively), all being well attended by representatives of the manufacturer members of the C.E.R.A. and of the numerous service agents and distributors in each area. The Ministry of Fuel (Divisional Office) were represented at the Manchester meeting, and the Ministry of Food at the Leeds and London meetings. Mr. E. G. Batt (chairman of C.E. R.A.) occupied the chair at each meeting.

C.E.R.A. agreed to take all necessary steps to persuade the non-C.E.R.A. manufacturers to co-operate, seeing that any agreed scheme must be nation wide to be effective; also, to see that the

register includes every recognised service agent in the country who is properly established in the Commercial Electric Refrigeration Industry.

As a further result of these meetings, C.E.R.A. unanimously decided to reconstitute the association, for the future well-being of the industry as a whole, to provide for three or more self-governing sections, each under its own chairman:

- (i) Machinery Manufacturers;
- (ii) Insulation Contractors;
- (iii) Service Agents and Distributors,

with a controlling council, consisting of equal representation of four per section (nominated by each section), under independent chairmanship.

The present full title of C.E.R.A. will be retained, as it is well known to all Government departments and, in due course, the revised constitution and rules of the new C.E.R.A. will be submitted for the membership in each section to be duly established in accordance therewith.

* * *

Canadian Subsidies for Foods

A Canadian Government scheme to cut the price of milk, tea, coffee and oranges is costing the Exchequer 40 million dollars (£10,000,000) in subsidies and reduction of duties.

"In the light of the great objectives for which we are striving", said Mr. J. L. Hsley, the Finance Minister, "this cost—which is only one cent. per person per day—is small indeed".

The press has hailed the plan as a more direct method of "killing the dragon of inflation" than an increase in the cost of living bonus.—*Reuter*.

* * *

Home Drying of Fruits and Vegetables

We have received a leaflet entitled *Home Drying of Fruit and Vegetables*, by B. G. McLellan, F.I.C., M.I.Chem.E., written for the benefit of possessors of gardens and allotments who find that they have more vegetables and fruit than they can use.

The making of a simple, inexpensive apparatus and also the manner of drying are well described.

Food Manufacture

"What is Banking?"

In view of the considerable and increasing interest among the public in the financial arrangements of the country, more especially with reference to post-war problems, a booklet entitled "What is Banking?" written by the Right Hon. R. McKenna, will be widely read. It is intended to provide, more particularly for people who are relatively uninstructed in these matters, a straightforward description of the way in which the banks work to subserve the economic interests of the nation. Its author has been chairman of Britain's biggest bank for over twenty-three years; he was Chancellor of the Exchequer in the early part of the last war; and his speeches, for which he has become famous, on subjects relating to monetary affairs are recognised as outstanding for their clarity and the independence of view which they convey. For all who appreciate or suspect that monetary affairs have a close bearing on the welfare of the country, this little work of twenty-four pages cannot fail to be both instructive and stimulating to further thought. It is published by Waterlow and Sons, Ltd. Price 6d.

* * *

The Nutrition Society

A whole-day conference of the Nutrition Society will be held at the London School of Hygiene, Keppel Street, London, W.C. 1, on Saturday, February 6, beginning at 11 a.m., to discuss "Nutrition in Pregnancy". Papers will be read by Mr. Aleck Bourne ("Foetal Development"), Dr. J. Hammond ("Physiological Factors Influencing Birth-weight"), Sir Joseph Barcroft ("Nutritional Functions of the Placenta"), Professor A. St. G. Huggett ("Diet of the Pregnant Woman (a) General"), Dr. Margaret Balfour ("Diet of the Pregnant Woman (b) Birthday Trust Experiment"), Mr. R. M. Titmuss ("Still-birth and Neo-natal Mortality").

The Chair will be taken at the morning session by Dr. F. H. A. Marshall, and at the afternoon session by Brigadier F. A. E. Crew.

A subsequent meeting will be held on "Nutrition in Infancy".

February, 1943

Sugar Beet Price

Growers' terms for the sugar-beet crop of 1943 repeat last year's Scottish fixed terms of 81s. per ton free on rail, but on this occasion bonuses of 1s. 8d., 3s. 4d., 5s. and 6s. 8d. per ton are to be added for deliveries at the Cupar factory respectively in each of the first fortnights of 1944.

The Scottish growers were pressing for a substantial increase. A Fifeshire grower stated recently that their claim was for £5 10s. per ton, as they hold that the Scottish average tonnage per acre is fully one ton less than the English average yield. His contention is that many English farmers receive about £1 per ton more than Scottish farmers for potatoes because in many areas their yield per acre is not so high, whereas the reverse is the common experience with sugar beet.

The late delivery bonus, this grower says, will have no effect in Scotland, as all crop supplies were delivered this season at Cupar factory by December 21. The Scottish crop for 1942 is reported to have an average yield of only 6.45 tons. Scottish growers, says this farmer, will be very disappointed with the 1943 terms. There will, he forecasts, require to be "absolute compulsion to get farmers to grow beet next season at these terms after the past season's lessons".

* * *

Food Substitutes in Belgium

Belgians have 57 varieties of coffee substitute to choose from, and they pay as much for the substitute as they did in peace for the real thing.

Altogether, says the Belgian newspaper *Vooruit*, there are on sale about 300 substitutes for common daily requirements.

The list includes 43 for meat extracts, 54 for spice, 9 for tea, 15 for egg and 73 for soap and soap powder.

* * *

Argentina's Surpluses of Wheat and Linseed

The Argentine Ministry of Agriculture estimates the exportable surplus of wheat as at December 12 at 8,399,000 tons (308,500,000 bushels), says Reuter. The linseed surplus is 3,123,000 tons.

Flour Control

The Minister of Food has made an Order entitled "The Flour Order, 1943", which came into force on January 17.

It revokes seven principal Orders relating to control of the flour trade, with amendments, directions and licences issued under them, and re-enacts their provisions in a more convenient form. Certain additional provisions have also been included in this consolidating Order.

The Order prohibits the use of white flour as an ingredient in the production by way of trade or business of any article of food other than bread or another type of flour, and in bread making limits the proportion to 25 per cent. of the flour used in "batch" bread produced in Scotland, and 12½ per cent. of the flour used in all other breads. It will thus be necessary to hold a special licence to use white flour in the making of any article of food other than bread—e.g., cakes, biscuits, etc.

A new provision prevents producers of flour, factors and importers from forwarding flour between any places in the United Kingdom where the cost of transport, by whomsoever borne, would exceed 2s. 6d. per 280 lb. There are certain exceptions, such as transport by water and transport to a buyer's premises situated in Cornwall, and movements of flour originating and terminating in Scotland.

* * *

Potato Flour in German Bread

Potato flour is to be added to Germany's bread, according to the German paper *Landpost*, says the Basle *National Zeitung*.

The new bread will consist of roughly 45 per cent. rye, 35 per cent. wheat, 20 per cent. barley and a small amount of potato flour.—*Reuter*.

* * *

Anglo-Burma Rice Company

The Anglo-Burma Rice Co., Ltd., incorporated in Burma in 1912, has been registered in England as a Colonial company pursuant to Order of the Board of Trade, with a nominal capital of nine million rupees in shares of Rs. 15.

"Simple" Food

"Americans soon will be reverting to the simple style of living their New England forefathers knew, according to Ernest Kuhn, chairman of the forty-first annual convention of the International Stewards' and Caterers' Association," states *Chicago Sun*.

"Kuhn said the food experts were having 'nothing fancy' for their own buffet supper.

"No caviar served in swans carved out of ice, no pâté de foie gras; just simple, nourishing food without fussy garnishings," he explained. "We are having beef stew. Of course we are also having green onions and assorted relishes, baked Kentucky ham, roast turkey, chicken flakes curry, lobster Newburg, duck stew in Burgundy wine, spaghetti, chef's salad, fruit salad au kirsch, cheese and toasted crackers and coffee. Just a snack, you might say. . . ."

* * *

Egg Albumen Economies

Although negotiations between the British Federation of Master Printers, Patra and the Ministry of Food on supplies of egg albumen for photo-litho and photo-engraving purposes have led to the release of supplies for essential purposes, the need to conserve supplies remains urgent.

To help in meeting this need, Patra has conducted laboratory and works trials that have resulted in the finding of a substitute which can be used in the making of bookbinders' glair employed in gold-blocking. It is used in exactly the same way as glair, and satisfactory results have been obtained on leather, Rexine and cloth with genuine and imitation gold foils. The solution is cheaper than egg albumen glair and possesses much better keeping qualities. It does not, however, light-harden with bichromates, and cannot, therefore, be used as a substitute for albumen in photo-engraving or photo-lithography.

This, and other methods of economising in the use of egg albumen in relation to the preparation of wet plates and the preservation of albumen solutions in photo-engraving and photo-lithography are described in Patra Information Leaflet No. 25, just issued to members.

OBITER DICTA

● There is no doubt that many artificial products have been a boon; artificial silk has added to the gaiety of nations, but the pre-war use of milk for the manufacture of such things as knife handles shocked me. Milk is too valuable to be used for any other purpose than as food. —*Sir Walter Langdon-Brown in "The Evening News"*

● I have often wondered to myself what is the definition of a "skilled worker" when someone who could tinker with a carburettor was classed as "skilled" and a man who, with a lifetime of knowledge behind him, was considered unskilled when, by his actions, he could make or mar 50 acres of land, valuable livestock or a productive fruit orchard. —*Lord Cornwallis, M.C., T.D.*

● I am proud to be able to say that I have never asked the people of this country to do anything they have not done. That is a great tribute to democracy. —*Lord Woolton in an interview with Philip Johnson, published in "The Star"*

● If Lord Woolton can save us from the eighteenpenny cauliflower and the tenpenny lettuce he will add to the thanks already owing to him by a grateful country. —*"Sheffield Telegraph"*

● A steak and kidney pie was analysed and found to contain only one per cent. of steak and no kidney. —*Dr. John Macmillan, Medical Officer of Health for Woolwich, in his report for 1941.*

● Of seventeen samples of artificial cream examined bacteriologically in Nottingham last year, twelve showed the presence of *Bacillus coli*, a cause of internal trouble. —*Dr. Cyril Banks, Medical Officer of Health for Nottingham.*

● In these stern times, when it is a punishable offence for the meat content of a sausage to exceed a rationed maximum, there may well be wishful thinking that the soya bean padding may be more exciting than bread-crumbs. —*"Manchester Guardian"*

● By next summer both people who eat out and those who eat at home will probably be using a teaspoonful of dark brown powder one day a week instead of their usual joint. —*"The Star" Reporter.*

"Chemical Industries"

The 1942 edition of *Chemical Industries* has been published by Leonard Hill Ltd., 17, Stratford Place, W.1, with a large number of corrections and additions. A full review of this standard reference book was not published in *FOOD MANUFACTURE* because the signs indicated that it would be out of print on publication. This has proved the case.

* * *

Tryptophane and Cataract

New methods of preventing and curing cataract of the eye and other signs of old age in human beings might be developed on the basis of a discovery reported from Johns Hopkins University.

Professors Anthony A. Albanese and Wilhelm Buschkew, of the university's department of ophthalmology, have reported to the American Association for the Advancement of Science some significant results of their experiments on rats.

Tryptophane has specific functions to perform in addition to serving as a building block for the proteins of the body.

The amino acid appears to affect certain key machines of the living body, perhaps the endocrine glands, upon which depend the normal bodily functions. A diet lacking in tryptophane causes, in addition to cataract of the eye lens, baldness, damage to the teeth, sterility, etc.

All the important tissues of the body which are composed of epithelial cells were damaged by deficiency of tryptophane. When direct treatments for human beings have been developed and tested, the value of tryptophane for young and old persons will be determined.

* * *

Tinned Horsemeat

Tinned horse-meat may be exported from the U.S. to Europe.

Revealing this recently, Senator Murray said Lease-Lend officials had agreed to investigate the possibility of exporting it.

"It seems quite feasible to me to send Europe the kind of meat the people over there have been accustomed to using," he commented. —*Reuter.*

Research in Industry

The Committee which the F.B.I. has set up (under the chairmanship of Sir William Larke) to consider the question of industrial research, has reached certain preliminary decisions with regard to its programme of work.

The primary task of the Committee is to stimulate the utmost possible interest in industrial research. It is proposed to make a survey of present industrial research activities and to obtain an indication of the results already achieved in many spheres of British industry. The necessary information from which the survey can be compiled is being sought from various sources, including industrial research associations, commercial associations and individual firms, the assistance of which is earnestly requested.

The restoration of export trade will be an immediate post-war necessity, and this and our domestic needs will be dependent upon industry's productive and competitive power. This in turn must be largely dependent upon technical advance and research. The Committee hope that their work will not only point the way, but provide a stimulus to all concerned to harness the great body of scientific ability and experience which this country possesses and has organised with such success in the war effort, for the work of industrial development and reconstruction in the post-war period.

* * *

"Shrunk" Overall Cloth

Wartime needs have stimulated many economies which in peacetime tended to be ignored or overlooked. Similarly, anything which helps to increase output has been welcome.

One development which fits into both categories is the shrinkage treatment of overall clothes. Practically all the Services' overalls are now made from pre-shrunk cloth. Eight of the eleven utility overall fabrics for the public have been scheduled "fully shrunk" by the Board of Trade.

Possibly some private purchasers may have hesitated to pay the required 1s. to 2s. 6d. more per garment when, on the sur-

face, the only difference they can see is that the dearer overall is shrunk and the cheaper one is not. Clearly, the relative values are not quite so simple as that. The weight of evidence approving the "shrunk" overall is too authoritative and overwhelming to be ignored. To discover the hidden economy, therefore, we decided to enquire into the matter, and consulted the Bradford Dyers' Association, whose "Rigmel" shrinkage treatment is reputed to be used for about 70 to 80 per cent. of this class of work.

The first surprise was the discovery that shrinkage treatment greatly improves the cloth in quality. Properly "shrunk" overall cloth, being closed in in texture, automatically becomes 8 to 12 per cent. better in weight and density because it has 8 to 12 per cent. more yarn in each inch.

From the employers' point of view, the correct fitting "shrunk overall" makes the wearer less subject to accident (*vide* "How Factory Accidents Happen", a recent Government publication). There seems also to be substantial evidence that the wearer of a correctly fitted overall (as compared with one bought too large, or one shrunk in the wash too small) increases his, or her output by an average of 1 per cent. or more. A simple wage calculation shows that two or three weeks of such improvement would fully pay for the initial difference in the cost of the shrunk garment.

* * *

Chlorinated Rubber Spreading Paste

Much interest attaches in connection with the treatment of steel, and metals generally, as well as wood, canvas, and other surfaces, to a new product known as Detel (chlorinated rubber) Spreading Paste, which incidentally is non-poisonous and inert, with no action on any food product. This can be applied in simple fashion by means of a palette knife and made smooth with a flat scraper or with the back of a fairly broad brush. If the surface is smooth one thin coat is sufficient, such as 4 to 6 ozs. per sq. yd., but rough material will take more. When, however, the surface is very hairy, as in the case of some canvas, a

thin coat is scraped on, allowed to dry, and then slightly sandpapered to remove the fibres which stick out, after which a second thin coat is applied, giving a smooth final finish. A valuable application also is the stopping of leakages in tanks and other equipment.

The result is to form a coating which is not only completely waterproof, as good as rubber, but is also equally proof against acids, alkalis, and other corrosive agents, including the atmosphere.

The makers are Detel Products, Ltd.

* * *

Can without Metal

The Macmillan Petroleum Corporation (U.S.A.) has recently announced its revolutionary "can without metal". Developed after five years of research, the container makes use of no critical materials and uses farm products instead. Three plastics applied to a three-ply spirally-wound paper container are made by a secret formula from ingredients of the farm and cattle range, include corn and other grains, flaxseed, animal tissue and bones. Less expensive to produce than tin, the new containers are just as durable, lighter, may be opened by an ordinary pocket knife.

* * *

Canned Potatoes for Desert Armies

Troops in the Middle East will soon be having Norfolk canned vegetables with their "bully" beef.

A factory in a Norfolk market town is turning out canned potatoes destined for this theatre of war at the rate of two and a half tons a day. The firm is now endeavouring to obtain the labour necessary to enable it to double this output.

* * *

Seasonal Reminders

We acknowledge with many thanks seasonable reminders from the Vegetable Parchment Mills; High Duty Alloys, Ltd.; W. J. Bush and Co., Ltd.; Rex Campbell; Victor Wolf, Ltd.; and Ch. Goldrea, Foucard and Son.

COMPANIES

Fruit and Produce Exchange of Great Britain

At the twenty-first ordinary general meeting of the Fruit and Produce Exchange of Great Britain, Ltd., Mr. P. Pask (the chairman), alluding to the balance-sheet, said: You will have noted that this is our twenty-first annual meeting. It will, I am sure, be a cause of satisfaction to you that on our coming-of-age as a company the balance-sheet presented is the strongest we have yet submitted.

On many occasions in the past it has been made clear to you that fruit from overseas provides a very large source of our yearly income. You are also well aware that, as an outcome of the war, this productive source of income has practically ceased to exist. The figures we submit to-day will, I think, be an assurance that your directors and all responsible for the management and development of your company's interests are alert to adapt themselves to changing circumstances. In this connection I should now inform you that we are increasingly utilising our resources in connection with home-grown fruits and vegetables.

Turning to the balance-sheet, I think I can say that all the alterations on the assets side are the result of our delimiting the subsidiary companies. The amount which was shown in the previous balance-sheet for shares in these subsidiary companies has now gone and the change is partly reflected by increases under "goodwill" and "furniture, fixtures and fittings".

Our investment in War Loan is now £150,000 as against £100,000 in our last accounts, which investment is practically the same amount as the issued capital of your company.

I now have pleasure in moving the following resolution: "That the directors' report and accounts for the year ending September 30, 1942, be received and adopted. That the dividend for the year to September 30, 1942, on the 5½ per cent. Cumulative First Preference shares paid, less income-tax, on October 1, 1942, be confirmed, and that a divi-

dend on the 20 per cent. Non-Cumulative Preference shares at the rate of 20 per cent. per annum, less income-tax, and a dividend on the Ordinary shares at the rate of 25 per cent. per annum, less tax, be paid, and that the same are hereby declared, and that the same be payable on December 19, 1942."

Mr. J. R. Colyer formally seconded the resolution, and, there being no questions, it was put to the meeting and carried unanimously.

* * *

Tate and Lyle

At the fortieth annual ordinary general meeting of Tate and Lyle, Ltd., Sir C. E. Leonard Lyle, Bt., M.P. (the president), was in the chair.

The following are abstracts from the President's statement, which was circulated with the report and accounts, and which was taken as read:

Last year it was decided that under the present conditions I should not follow my usual practice of presenting to you at annual meetings a detailed account of the activities and finances of the company and its subsidiaries. In my opinion it will again be inadvisable to do so. Therefore I will ask the shareholders to accept the report and accounts without further detailed comment.

From the commencement of the war we have worked in close co-operation with the Ministry of Food. Our relations with the Sugar Division are an excellent example of the way in which the wartime objectives of the State can be achieved by goodwill and co-operation with private enterprise.

I should like to place on record our appreciation of the efficient and effective manner in which the policy of the Minister has been carried out by the Division.

The president then moved the adoption of the report and accounts for the 52 weeks ended September 26, 1942, and the approval of the dividend recommendations in the report, including a final dividend of 10 per cent. on the Ordinary shares, making 13½ per cent. for the year, subject to income-tax.

Mr. G. Vernon Tate (chairman

of the company) seconded the resolution and it was carried unanimously in the absence of question and comment.

Salt in Canada

Commercial production of common salt in Canada during 1941 totalled 560,845 short tons, valued at \$3,196,165, compared with 464,714 short tons at \$2,823,269 in 1940. In 1941 salt was produced in Nova Scotia, Ontario, Manitoba and Alberta, and of the total Canadian output in 1941 Ontario contributed 477,170 short tons, or 92 per cent. Statistics of Canadian salt production represent the recovery of the mineral from brine wells, with the exception of Nova Scotia, where the output comes entirely from the underground mining of rock-salt deposits. The quantity and value of Canadian salt produced in 1941 are the greatest ever recorded.

* * *

Self-Sufficiency for Barbados

Under a scheme to make Barbados more self-sufficient, the Governor of the Island to-day laid an application for a free grant of £171,810 before the Assembly and Legislative Council.

The islanders, who in the past have depended on one crop—sugar—will under the new scheme be encouraged to develop intensive mixed farming on a basis of animal husbandry, thereby reducing seasonal unemployment.

Research stations will be set up, and the peasants encouraged, by means of subsidies and loans, to make better use of their holdings.

The free grant is being applied for under the Colonial Development Welfare Act.

The grant is composed of £84,875 capital expenditure, and £86,935 recurring over five years. It provides for central dairying and stock-breeding stations and local agricultural stations, an artificial manure subsidy to assist small-holders to improve the fertility of their holdings, and a grant for irrigation.

A loan of £40,000 will also be used for irrigation and to extend the operations of the Peasants' Loan Bank, enabling it to finance the building of small-holders' houses and the purchase of stock.

Food Manufacture

Information and Advice

Oatmeal Parkins

8,507. *Required a recipe for oatmeal parkins which will comply with the Cake and Flour Confectionery Order.* (London.)

The following mixing will give the required result :

Ingredients.	Weight.		Fat.	Sugar.
	lbs.	ozs.	lbs.	lbs.
Oatmeal ...	6	0	0·510	—
Wheatmeal flour ...	6	0	0·084	0·150
Neutral fat ...	3	0	3·000	—
Sugar ...	4	0	—	4·000
Syrup ...	4	0	—	3·160
Ground ginger ...	4	—	—	—
Baking powder ...	4	—	—	—
Salt ...	2	—	—	—
Liquid egg ...	8	—	0·046	—
Milk (liquid) ...	3	8	0·003	0·115
Totals	27	10	3·643	7·425

Net yield of 25 lbs.

Cost per lb. ...	4·42d.
Fat content ...	14·57 per cent.
Sugar content ...	29·70 per cent.
Total fat and sugar ...	44·27 per cent.

Mashed Potatoes in Flour Confectionery

8,543. *Required (i) some details regarding the use of mashed potatoes in flour confectionery. Also (ii) the best way to cook potatoes to be mashed for use in this confectionery.* (London.)

(i) The following is a mixing for plain or fruit cake with mashed potatoes which has given good results :

- 1 lb. margarine.
- 2½ lbs. sugar.
- 1 lb. neutral fat.
- ½ oz. salt.
- 1½ lbs. mashed potatoes.

Mix these ingredients in the bowl and cream them for about 10 minutes or until light and free.

2 lbs. liquid egg.

Add gradually to batter and beat up for 5 minutes.

4 lbs. flour.
1½ ozs. baking powder.

Sift together and add to batter with the milk.

2½ lbs. milk.

Add to the batter with the milk and mix until clear.

This makes very good plain cakes and will also carry fruit to make fruit cakes.

(ii) Experiments are still proceeding on the best way to cook potatoes to be mashed for use in confectionery, but so far it has been found best to bake the unskinned potatoes in an oven at about 300° F. for nearly an hour. The potatoes after this treatment are easily skinned and are not soft and wet when mashed.

A recipe for scones with mashed potatoes is as follows :

- 2 lbs. mashed potatoes.
- 2 lbs. scone flour.
- 4 ozs. sugar.
- 4 ozs. cooking oil.
- ½ oz. salt.
- 1 pint milk.

These ingredients are made up like a scone dough. The dough is rolled out to barely ½ inch in thickness and cut out with a 4-inch plain cutter. After egg-washing they are either baked in a hot oven or on the hotplate, turning them over before baking is completed.

The scones are of a good-appetising appearance, and can be made very cheaply.

Candied Peel

8,521. *Required information on the manufacture of candied peel.* (Essex.)

The peels are received at the factory in brine, and the first step in their elaboration is the elimination of salt—a process, although simple, which occupies much time and copious amounts of cold water.

The peels are next introduced into special tubs, symmetrically lined up and containing syrups of ranging density. The object of this curing is to introduce into the peel the highest practical amount of sugar, and this is achieved by immersing it into successive syrups of increasing strength. The curing process is only complete after the lapse of several weeks, and when the peel is ready it is drained free from excess syrup by means of sieves. The cured peel is used as the material for different finished products. For candied peel it is selected and placed on trays to dry off in air-heated ovens for about 12 hours. From the drying oven the peel goes to tables where prepared candy sugar is applied. This candy sugar is produced by rubbing up very hot syrup until a required degree of aeration is obtained. The peel is then placed on trays and a final drying in the ovens effected, after which it is ready for packing and distribution.

Information Supplied

8,354. *Formula for the manufacture of mayonnaise.* (London.)

8,371. *Literature concerning the manufacture of Vermicelli.* (London.)

8,376. *Suppliers of malted vinegar.* (Eire.)

8,386. *Manufacturers of uncooked potato flour.* (Leics.)

Information Required

8,515. *Required makers of machinery for mixing potato flour with cereal.* (London.)

8,518. *Automatic packing machine required, suitable for handling welding electrodes up to 18 ins. long. These electrodes will be delivered from an automatic plant at fairly high speed.* (Warwickshire.)

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Process for Preparing Preserved Egg Products

This invention relates to a process for preparing preserved egg products and to preserved egg products prepared by said process.

The term "egg products" used herein is intended to denote only whole egg, egg yolk and egg white.

The invention contemplates adding to liquid egg products from 1 to 10 per cent. by weight (i.e., much smaller amounts than hitherto) of a sugar such as glucose, fructose or maltose or a mixture of such sugars, and thereupon heating the mixture to a temperature not exceeding 70° C.

This heating not only effects the concentration of the mixture, but it has been ascertained that during said heating a reaction between the egg product and the added sugar or sugars also takes place.

The nature of this reaction is not clear, but said reaction is undoubtedly the reason for the efficacy of the process, since egg products preserved thereby are superior in keeping power to those preserved by the known methods.

It is assumed that the added carbohydrate reacts with the fatty material of the liquid egg product, and especially the phosphatides. Support is lent to the assumption by the fact that when extracting egg yolk which has been treated by the process of the present invention, with a phosphatide solvent, such as methyl or ethyl alcohol, in which sugars are normally insoluble, a certain proportion of sugar passes into solution, together with the fatty material, especially the phosphatides, yielding a clear solution from which it is very difficult to separate out the sugar.

A particularly suitable substance for incorporating with liquid egg products prior to concentration in accordance with the invention is a mixture of substantially equal parts of glucose and fructose, known under the registered trade mark "Nulomoline".

The heating of the mixture in accordance with the invention is advantageously effected in a vacuum plant at a temperature preferably lying between 50° and 70° C. The moisture content is preferably reduced by the evaporation to, for example, between 10 and 30 per cent. The thus concen-

trated product will keep for an indefinite period without any deterioration.

Moreover, if desired, the liquid egg products, treated in accordance with the invention, can be evaporated to dryness by any suitable method such as spray drying or drum drying.

547,915. *Fred Boehm, Ltd., and Henry Kunzer.*

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

546,853. *FLETCHER AND CO., LTD., G., and MACPHERSON, G.*: Removal of sugar deposits from vacuum pans used for sugar evaporation.

546,887. *CROWE, G. E. W.*: Boiler or steamer for culinary or other purposes.

547,177. *WINSKILL, J. W., and MEDWAY PAPER SACKS, LTD.*: Paper bags.

547,209. *HOLLY SUGAR CORPORATION*: Processes of treating sugar-beet juice.

547,228. *WHITE CAP CO.*: Closure caps for bottles, jars, and like containers.

547,229. *DAVIES, L. E.*: Method of closing and sealing filled receptacles.

547,331. *LOWE CORPORATION, J.*: Extrusion machines, for example, for extruding raw doughnuts.

547,359. *BRAND, H. M.*: Lids for cans and like containers.

547,360. *BRITISH THOMSON-HOUSTON CO., LTD.*: Refrigerator cabinets.

547,374. *HARRISON, J.*: Apparatus for drying grass or the like.

547,386. *TUTTLE, H. C.*: Steam generators, with particular reference to steam-cooking devices.

547,393. *BRITISH THOMSON-HOUSTON CO., LTD.*: Temperature-control devices for refrigerators.

547,415. *HOWARD, A. C., and ROTARY HOES, LTD.*: Rotary hoeing, cultivating, and like agricultural machines.

547,476. *TAYLOR, G. W.*: Wrappers for bottles and other containers.

547,486. *NATIONAL OIL PRODUCTS Co.*: Extraction of oils having high vitamin contents from fat-soluble vitamin-containing oils.

547,523. *CLELAND, LTD., W. W., and BUCHMAN, A. A.*: Boxes of paper, cardboard, or the like.

547,556. *LIDKOPLINGS MEKANISKA VERKSTADS AKTIEBOLAG*: Centreless grinding-machine.

547,557. *LIDKOPLINGS MEKANISKA VERKSTADS AKTIEBOLAG*: Centreless grinding-machine.

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

TREX.—618,728. *Defensive Trade Mark application based on Registration No. 584,181 (3138) xlii.* Meat, fish (except live fish), dead poultry, and dead game; meat and vegetable extracts; preserved, dried and cooked fruits and vegetables; jellies (for food), jams; eggs, milk and other dairy products (for food); edible oils and edible fats, but not including vegetable fats for cooking and frying. **J. Bibby and Sons, Limited**, 21, King Edward Street, Liverpool, 3; Manufacturers. To be associated with No. 584,151 (3138) xlii and others.

SUNMILL.—619,264. Self-raising flour, cake flour, batter flour, Yorkshire pudding and pancake mixture, semolina, rice and maize mixture for moulds and puddings, preparations consisting mainly of baking powder and binding materials for use in the baking and confectionery trades, baking powder, and flavoured mould mixture in the nature of jelly or blanc-mange. **Sunmill Food Products, Limited**, 93, Rivington Street, London, E.C. 2; Merchants.

COUVERITE—Erratum.

618,877. The registration of Couverite was withdrawn and has not been registered by Anglo-Swiss Chocolate Co., Ltd.

New Companies

Winnington Dairies, Limited. (375882.) 20, Winnington Lane, Northwich, Ches. To take over the dairy businesses cd. on by Thos. R. Dean at Moss Road Dairy, Winnington, Northwich, Aubrey Redfern at Senna Lane, Comberbach, nr. Northwich, and by Arthur G. Tunna at Winnington Lane, Winnington. Nom. cap.: £4,000 in £1 shares. Dirs.: T. R. Dean, Moss Road Dairy, Winnington, Northwich; A. Redfern, Senna Lane, Comberbach, nr. Northwich; A. G. Tunna, Winnington Lane, Winnington.

Vitafoods (Distributors), Limited. (375895.) Nom. cap.: £1,000 in £1 shares. Dirs.: A. J. R. Prentzel, Mayfield, Beech Hill Avenue, Hadley Wood, Herts; E. D. Macleod, 64, Woodside Avenue, Highgate, Middx.; V. B. Deboo, address not stated.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.