

FOOD MANUFACTURE

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Contents

Editorial	- - - - -	39
Jam Manufacture. Part I. George Rauch		43
Ice Cream Powders and Mixes. Specially Contributed	- - - - -	48
The Baking Industry. J. Stewart	- - - - -	52
Properties of Foods	- - - - -	55
Continental Communiqué	- - - - -	56
Nutrition and National Health	- - - - -	57
Meats and Fats	- - - - -	57
Advice to Bakers	- - - - -	58
Food Analysis. D. W. Grover, B.Sc.	- - - - -	59
Preservatives in Food	- - - - -	63
The Proof of the Pudding. T. Crosbie-Walsh		64
Institute of Refrigeration	- - - - -	65
News	- - - - -	66
Information and Advice	- - - - -	75
Recent Patents, Trade Marks and New Companies	- - - - -	76

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

February, 1945

[E]

Dehydrated Vegetables—Post-War

ADMISSION of the excellence of dehydrated vegetables, their culinary and nutritive qualities, and their convenience leaves several things unsaid when considering the probability of their survival in the post-war domestic market.

In the *Canner* (September 23, 1944) is published a report prepared by the U.S. Tariff Commission in response to requests from the Senate Committee on Finance and the House Committee on Ways and Means, which sums up American opinion on the subject.

As after the last war, the future of the industry will depend on the domestic civilian market, but, owing to an entirely different situation, future experience will not coincide with past experience, says the report.

Despite the rise of the frozen food industry as a new competitor in the field, some experienced processors predict as great a future for dehydrated vegetables as for canned and frozen vegetables, although most of them believe that 90 per cent. of those who have been depending upon war contracts alone will be forced out of business.

The report does not anticipate a large export market, and suggests that the *United Kingdom will probably be the largest for dehydrated vegetables and soups*. The Continent is not considered to be a potential market. The United States dehydrated vegetable industry has little to fear from foreign competition after the war, and imports will not only have to overcome the United States duty (now 35 per cent. *ad valorem*), but will have to compete with a domestic industry probably better equipped mechanically than the industry in any foreign country.

Turning to the consideration of products which are likely to survive, stress is laid upon soup mixtures, powders, and flakes for use as seasoning, although these latter products will only provide a small outlet for the present capacity of the industry.

Referring to potatoes, it is stated that these accounted in 1943-44 for more than half the production of dehydrated vegetables, and if an extensive civilian market for them can be developed it will go far to sustain the industry. It is recog-

nised that this product had no important civilian market before the war, and the development of post-war markets will probably require extensive advertising. The general trend of the report is optimistic, tintured with considerable caution. The number of vegetables handled will be small; military supplies will be less essential, the future of the industry depending primarily upon such civilian markets as may be immediately found and later developed.

The important matter of costs is discussed, and the report somewhat naïvely states that the prices of dehydrated products will be important in determining the outcome of the competition between dehydrated vegetables and those in other forms. As in this country, the present costs of dehydration are not indicative of future costs. Again, the report is optimistic and is of the opinion that as experience is gained, and as labour and raw material become available on better terms and in steadier supply, costs may be expected to show a downward trend, especially where dehydration is carried on in conjunction with canning or freezing, or both, when the plants should be able to reduce overhead costs, the same equipment being used in the preliminary stages of all three processes. *Any forecast based on present-day estimated costs is highly speculative.* (The italics are ours.)

Economic Policy and Means

A recent report of the Committee on the Economic Policy of the U.S. Chamber of Commerce contains much which applies to post-war conditions in this country. One of the points stressed is the need for changes in methods of taxation as a means of aiding business expansion in post-war years. "The war-time rates are so high they impinge heavily on incentives to invest and undertake new job-making enterprises, and therefore the rates should be cut drastically, and especially onerous taxes such as the war-imposed excess profits tax should be repealed," says the report. "Greater provision should be made for measuring business income over a period of years for taxation purposes. . . . The double taxation of income, first in the hands of the corporation and then in the hands of the dividend receiver, places a dual penalty upon corporate enterprise and the job-maker. This double and discriminatory system of taxation should be corrected. Since business cannot adjust itself to continuous uncertainty, every effort should be made to adopt a system of taxation which will not require periodic disturbance. Otherwise the constant threat of higher and confiscatory taxes will thwart new enterprise and investment."

Flexible wage and price policies are urged, the report declaring that constant change and adjustment of prices and costs are inherent in a free, dynamic, and changing economic society. The

highest wages in conformity with the prevailing productivity of an economy are an indispensable incentive for industrial progress. A social security programme should be designed to protect individuals and not occupations or industries or particular commodities.

With regard to the matter, which is being discussed widely here, of Government competition, the report says that the respective jurisdictions of Government and private enterprise should be clearly marked. The primary objection to Government competition with private effort was declared to be "its dampening effect on private initiative and effort."

The Committee, in common with many of us on this side, is concerned about competition *versus* monopoly. Competition, it is asserted, "not only protects the consumer against unreasonable prices, but also furnishes a necessary stimulus to lower costs of production, to improve services and products, and to develop new services and products."

We commend for attention the remarks of Mr. J. Cameron Thomson, chairman of the Committee, who in a foreword to the report says: "A free society must remain primarily and fundamentally a voluntary society. This means that there must be a proper balance between control and consent, between regulation and voluntary action. Without regulation and rules we would have chaos and ineffectiveness; without consent and voluntary decisions we would have regimentation and totalitarianism. While the dividing lines between these opposing concepts cannot be fixed once and for all, we will retain a free society only if we maximise consent and voluntary decision."

National Flour and Bread

The decrease in the rate of extraction from 82½ per cent. to 80 per cent. has revived the eternal white v. brown bread controversy. According to Colonel Llewellyn, Minister of Food, the change has been made possible by the availability of ships to import the necessary additional wheat. He also points out that the reduction of extraction will result in the production of additional feeding stuffs in the form of millers' by-products.

Many people "have written to *The Times*" about it. Lord Bledisloe comments that the change seems to indicate that the unnatural food known as "white bread"—the product of steel-roller flour mills and of the public illusion that whiteness betokens purity—is to be gradually reintroduced into the nation's food. He is aware that the scarcity of milling offals has militated against the optimum rationing of many farm animals, notably the pig, but suggests that the remedy lies not in nourishing swine at the expense of human beings, but in our imported breadstuffs taking the form solely of wheat and not of white flour. Thus through the medium of British flour mills far more bran and

other milling offals would, on balance, be available for our stockowners. He regards the eventual consumption of white bread as a slipping back "into the abyss of malnutrition in face of powerful industrial pressure or public ignorance."

Another writer thinks the issue is quite simple. "When the battle for freedom is over," he says, "are we to eat what we ourselves like or what Lord Bledisloe thinks is good for us?"

These are all old arguments and need not here be elaborated. The two schools will never be reconciled and the waters of controversy will be troubled unless perchance calmed by the oil of "fortification."

Bulk Purchase of Commodities

There has been a considerable amount of discussion about freedom of commodity markets after the war, and opinions have been expressed on the desirability of permanent Government bulk buying of raw materials. The Federation of Commodity and Allied Trade Associations has recently challenged this. There is no truth in the contention that bulk buying is a new Government idea. The trade in wheat, meat, oils, fats, tea, coffee, cocoa, wool, rubber, and tin can be considered as bulk buying. The Federation comments that "the implication in all the new proposals is that a Government can secure benefits which are not available under free and open trading. It is never clear to whom these benefits will accrue, since in many cases the same scheme is supposed to satisfy a producer demand for higher prices and a consumer need for lower prices."

A memorandum of the Federation, discussing the free market machinery of pre-war days, points out that this machinery greatly reduced the unit cost of the commodities, comprising as it did commodity exchanges, warehouses and transport, and correlated world supply and demand and made and maintained a current uniform world price. Government bulk buying for strategic reasons has been comparatively successful by reason of war conditions. This has been largely due to the experience of those versed in the traditional methods of free trading. The Federation recalls that the huge transactions in the past proceeded with the risks and responsibilities carried by individual traders, and disputes were, in the main, settled by arbitration within the trades without recourse to ordinary law courts. Further, says the Federation, if it is now proposed to place commerce on a political footing and to substitute arbitrary authoritarian bargaining for free and open trading, it is not difficult to foresee the international friction which will arise under such a system of State bargaining.

Commenting upon the Government bulk buying of cocoa in West Africa, the Federation discloses that this scheme was propounded without consulting the trading organisations, whose efforts in-

creased cocoa exports from the Gold Coast and Nigeria from an average annual figure of 44 tons in the 1890's to 332,000 tons in the 1930's. The Federation asks: "Is it on the basis of such figures that the case for peremptory supersession of individual trading enterprise is founded?"

Future of the Confectionery Trade

"If our trade is to be carried on in the post-war years on the same lines as it was from 1930 to 1940, I honestly think you should be downright ashamed to invite the men who have been fighting for us . . . to enter a trade where they will have to work from eighty to ninety hours every week for fifty-two weeks in the year and be very lucky if they can earn 9d. an hour, or £3 net a week. I think the advice you should give to those thinking of entering our trade should be the same as *Punch* gave to those about to be married." Thus writes Mr. L. C. Miles, Chairman of the Portsmouth branch of the N.U.R.C., in *Confectionery News*. He goes on to paint a dismal picture of the confectioner's life. He complains that he cannot take his wife to church on Sunday without coming up against the big manufacturer, who promptly goes to the cinemas, chain stores, Co-ops, drapers, and goodness knows who else, who cut prices. The confectioners, on their part, are reduced to selling packets of tea and even second-hand clothing, complains Mr. Miles. He does not agree with those who suggest that bright, clean shops, trade education, and C.T.C. advice bureaux will solve the problems or make the trade fit for heroes to return to. Mr. Miles challenged the trade to produce a scheme which would put it on a sound basis, and urged all sections to collaborate. What the scheme would consist of does not clearly emerge, but apparently Mr. Miles is satisfied that if confectionery were confined to confectioners' shops there would be room for 10,000 ex-Servicemen to open profitable businesses.

Essential Transport for Milk

Dairies, milk depots, and creameries have for a considerable time experienced difficulty in obtaining vehicles even for their most essential purposes, and at present, even under the most favourable conditions, five months must elapse between the date of the application to the Regional Transport Commissioner for a new vehicle for replacement purposes and its supply. In the case of the larger types of vehicles the time lag is considerably greater.

The Ministry of Food therefore suggests that all operators of such vehicles, including milk hauliers, should anticipate their requirements by applying for replacement vehicles not less than six months before they expect their existing ones to become

worn out. It is essential that applications be kept down to the minimum consistent with the safeguarding of essential milk transport services, and it is desirable that particulars of the applications made to the Regional Transport Commissioners should also be notified to the appropriate Assistant Divisional Food Officer (Transport) of the Ministry of Food. In the case of road chassis required for mounting milk tanks, it will be helpful to operators if information regarding applications to Regional Transport Commissioners is also given to the Milk Division, Ministry of Food, Thames Ditton, Surrey.

National Beverage

In Gissing's words telling of "the English genius of domesticity shown in making afternoon tea," substitute "British" and add "in the home" and one meets a striking truth. The Dutch may have begun the fashion in Europe; but we in our own country took the lead and became not only a nation of tea-drinkers but of tourists abroad who taught European countries how we wanted our tea made whenever we visited them. The year 1658 saw the beginnings with the famous advertisement of Thomas Garway announcing "the excellent and by all physicians approved China drink, called by the Chinese Tcha, by other nations Tay, alias Tee" to be obtained at the "Sultanness Head Cophee-House, in Sweeting's Rents by the Royal Exchange." That date fixes the birth of this powerful influence on British welfare and *modus vivendi*. Lords Ossory and Arlington brought their first batch of tea from Holland in 1666; Dr. Johnson had his first taste of "China drink" in 1660; so the dates when tea history began in Britain agree. And after Dr. Johnson and his famous two-quart pot came Thackeray and Erasmus Darwin, Lamb and Hazlitt, Cowper with his "cup that cheers," De Quincey with his praise of tea at the fireside, and others to describe tea-drinking in their writings. Indeed, an American critic maintained that the tea-drinking habit habitually fills the gaps in some English novels—in "David Grieve," for example, "they drink tea forty-eight times," he tells us.

Apart from such boosting from the *littérateurs*, tea became a national beverage because of such pioneers as Catherine of Braganza, tea-drinking queen of Charles II, and that Duchess of Bedford who served tea and cakes at five o'clock to avoid her "sinking feeling"—a phrase she introduced. The English botanist Sweet proved there was only one kind of tea plant; others in science showed that 2 grains tannin per cup gave tea its "strength" and 1 grain caffeine per cup its stimulus with a delayed action of fifteen minutes. Lastly, one must mention that genius Josiah Wedgwood who gave us cups and saucers to delight the eye as much as the contents stimulate the lethargic spirits

—or should one say the tongue, since Congreve's association of tea and scandal has some truth in it!

Though Bach wrote a cantata for coffee, though the Far Eastern tea-pluckers had their songs sung as they gathered the harvest, no British composer has made a song praising the goodness of tea. But in railway buffets, after tea is proved again and again to be British, one rightly makes a song about the badness of tea with such a history. The very name should stimulate one. The Briton lavishes praise on those Continental dishes rewarding him after a day of tramping under a mid-European sun. Yet think of that other surge of the spirits when, after plodding wearily high up on Pennine or Derbyshire fell, one comes to farm or cottage with the magic sign splashed in white on grey limestone wall—"Teas"!

Volatile Oil of Mustard

In continuation of earlier work on mustard oils (*Forschungsdienst Sonderheft*, Vol. 1, 1936, p. 37, and *Forschungsdienst*, Vol. 6, 1938, pp. 83-94), which by reason of being published in a relatively inaccessible journal may not be well known to people in the food industry, H. Schmalfuss and H.-P. Müller of the University of Posen (Poznan) have studied the volatile mustard oil of Sarepta mustard, *Brassica juncea* Czern. et Coss. The sample they received was of Rumanian origin and was large enough for ample quantities of the oil to be obtained for fractionation and study. The authors report in *Forschungsdienst*, Vol. 17, 1944, pp. 205-206, that, contrary to what has been stated earlier, the volatile part of Sarepta mustard is wholly composed of allyl mustard oil, there being no crotonyl mustard oil. Three specimens of thiosinamine prepared from this mustard yielded snow-white needle crystals melting at 76° C.

Dehydrated Cabbages

The Milk Marketing Board's creamery at Camborne, Cornwall, has recently begun the manufacture of dehydrated cabbage. The factory is working twenty-four hours a day and handles about 20 tons of cabbages in that period. The manager of the factory is Mr. D. W. Watson, who was formerly at the Board's Norwich creamery. The Minister of Food, Colonel J. J. Llewellyn, visited the Camborne factory during a recent visit to Cornwall and sampled the dehydrated cabbage, which he declared tasted excellent. It is stated to be identical in appearance, when cooked, with the freshly prepared product, and the top grade is claimed to be equal in flavour to the best that caterers or housewives can offer. At Camborne every variety of cabbage except flatpolls is dehydrated. Savoy process very well, and a start will shortly be made with spring greens.

Jam Manufacture

PART I

Some modern jam factories are erected after careful planning and their position, buildings and lay-out are the result of preconceived conceptions. A greater number, however, grow from small beginnings, and their development is imposed by circumstances rather than by reasoned planning and more often than not they bear the marks of improvisation. The introduction of modern production methods and rapid mechanisation during the war will handicap obsolete factories in the post-war competition, and many jam manufacturers will have to review their position in the light of the latest developments. This series of articles will give a short survey of the present position.

GEORGE RAUCH

FRUIT-GROWING districts are as a rule not great consuming centres for factory-manufactured jam, and the question arises whether it is preferable to erect a factory near a centre of consumption or in a fruit-growing district. This question is not easily answered as there is a good case for both propositions

Where to Erect the Factory

The main fruit-growing centres are agricultural districts. The shortest possible time should be allowed to elapse between the harvesting of fruit and the preserving process. This is particularly the case with the highly perishable soft fruits. Strawberries and raspberries, for instance, deteriorate in a matter of hours in hot weather. These and other varieties arrive frequently in town factories a day after being picked, and are usually in a more or less advanced stage of fermentation. It is, therefore, obvious that factories situated in fruit-growing districts enjoy every advantage as far as this point is concerned.

It is usually easier for a growing factory situated in the country to find space for storage, extensions and new constructions, an advantage which will be well appreciated by people operating in built-up town areas.

The main disadvantage is the necessity of transporting the finished product to the consuming centres. Another point is the fact that many jam varieties are produced from imported fruits or pulp, which are more readily available in towns.

The chief consuming centres are towns and densely populated industrial districts. The fact that many manufacturers produce jam successfully in large towns, away from the fruit-growing centres, proves that there is a good case for this alternative.

The main advantage is with the small manufacturers. At times of glutted markets it is often possible to buy fruits more cheaply in towns than in the growing districts, as, in view of the highly perishable nature of some fruit varieties, the jam

factory offers the last resort for the fruit merchant. Large manufacturers usually have agreements or contracts with the growers in order to assure their raw material, while the small producer is at liberty to rely on day-to-day purchases.

Transport and storage facilities are more favourable in a larger town, especially if the town is a seaport. Another advantage is the possibility of building up a local trade based on the expedient of speedy deliveries, whereas distant factories are bound to maintain depots or special sales organisations, and it is easier for the local factories to deal with the individual requirements of its customers.

The disadvantages are as mentioned before: higher overheads, rates, general expenses, space for extension, problem of seasonal labour and the fresh fruit problem.

Overheads, general expenses, water, rates, etc., are lower in agricultural districts. Furthermore, it is essential for every factory to be able to call upon experienced seasonal workers. This is more difficult in towns, where the working population is continuously fluctuating. The importance of skilled seasonal labour can hardly be over-estimated. It is a great asset for any factory to be able to draw on a stock of experienced workers whenever the occasion arises. It is generally observed that a skill once attained is not lost even after long intervals. For instance, in the case of strawberry stalking experienced women working only a few weeks every year produce frequently as much as 30 per cent. higher output figures than newly engaged labour.

Buildings

Jam factories could save themselves a great deal of trouble by erecting or transforming their buildings according to a carefully conceived plan, suitable to their individual circumstances. The following factors are of fundamental importance as far as the factory buildings are concerned:

1. Possibility of introducing a continuous production line.
2. Large and lofty rooms.
3. Large and lofty cellars.
4. Light and ventilation.
5. Good water supply.
6. Sewage disposal.
7. Possibility of rail connection.

Both single floor and buildings with two or more floors are suitable for jam factories.

The attempt to squeeze a whole factory into one large single floor building has never been quite successful, as it invariably leads to congestion at times of high pressure, and it also makes effective production control very difficult. It is far better to divide the factory into sections of separate buildings. These buildings should be of a single design to simplify repairs and new constructions. Mechanical developments have made it possible to produce large quantities of jam on a comparatively small floor space.

It is difficult to discuss the size of buildings without knowing the contemplated output figures. A single floor building with a floor space of 30 yards by 25 yards should be sufficient for both medium and large production outputs. This is not taking into account the pulping plant, boiler-house, stores and offices. Buildings of the same size and construction could accommodate a bottling and canning department, another the boiler-house and pulping plant, etc. The boiler-house should be in a central position to cut the distance of steam transmission to a minimum. Building materials are preferably bricks or concrete; all wooden constructions should be avoided. Every building must be provided with its own canalisation, and the different sections of the factory should be connected by an efficient intercommunication system.

The ceilings should not be under 18 to 20 feet in height, preferably with skylights. Windows must be large with top openings. In order to avoid dirty corners and to facilitate cleaning it is advisable to round off all sharp corners.

Walls and Floors

The ideal wall covering is white tiling, but if this proves to be too expensive, anti-condensation paint may be used. Where the ceiling consists of corrugated iron it should first be treated with white lead paint before applying anti-condensation paint.

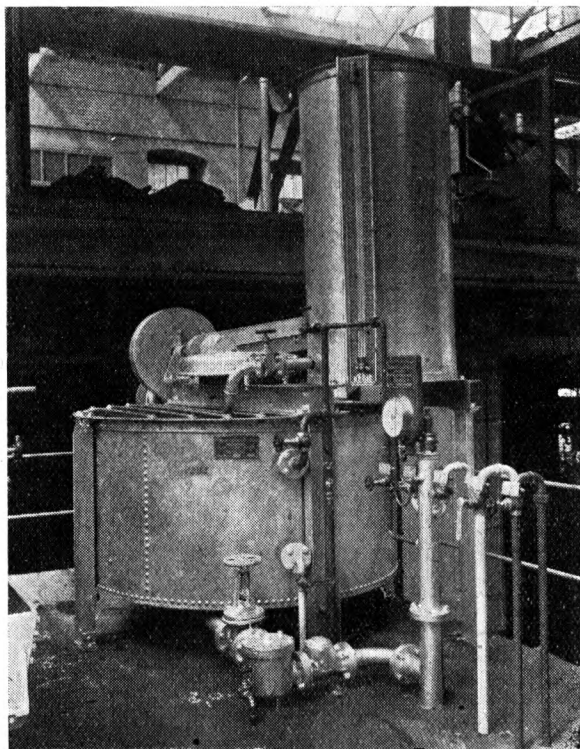
The floor in a jam factory offers quite a problem. It has to stand up to the rolling of heavy casks and trolleys, must be acid-proof, resistant to water and steam, easily repairable, and easy to clean. Concrete is the cheapest material, but once the surface is damaged it becomes the cause of never-ending trouble. Blue tiles are very durable but dangerously slippery. An excellent covering is a granalitic floor containing coarse dew stones.

If, however, concrete is used, the following floor proves fairly satisfactory: 4 inches of concrete in proportion of 3 parts of sand and 1 part of cement and a top layer of 1 inch of concrete consisting of 2 parts of sand and 1 part of cement. Only very good cement and well-sieved sand should be used for the top layer. The floor should have a slight slope to enable water to run away.

Sewage Disposal, Cellars, and Ventilation

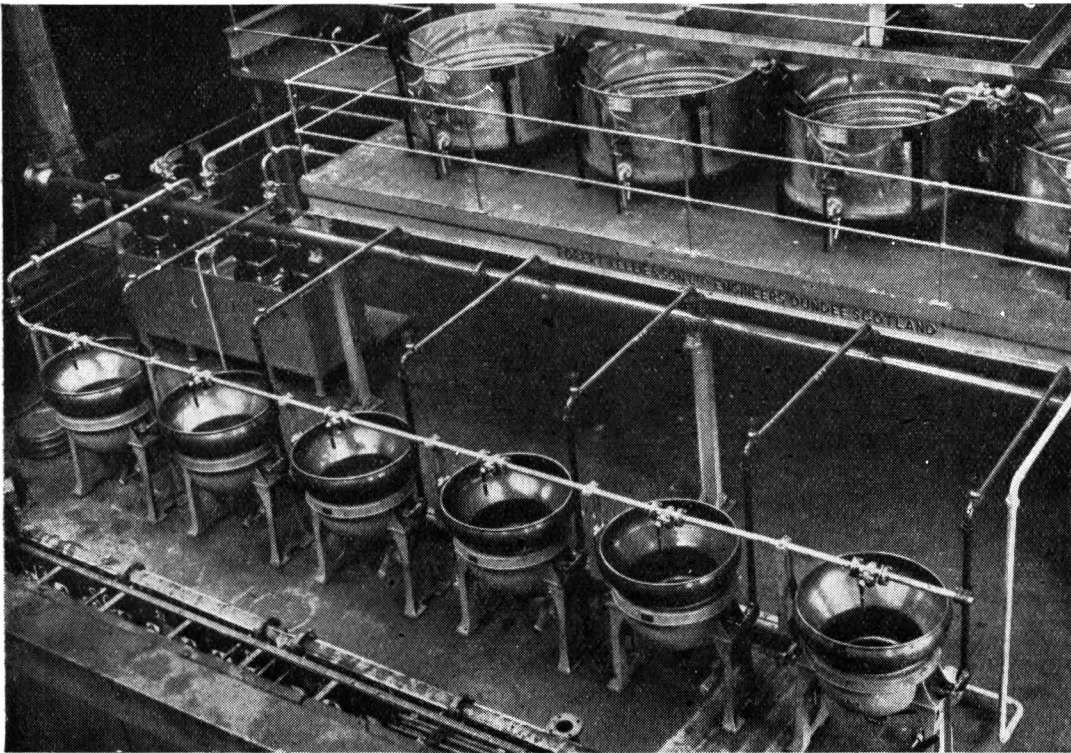
Good sewage disposal in a food factory is obviously essential for hygienic reasons. To avoid congestion, the drain pipes should never be less than 6 inches in diameter, and it is also advisable to provide traps for solid objects such as glass, etc.

No jam factory should be erected without a large and well-aired cellar. Not only are cellars most suitable for storing sensitive pulps, as for instance blackcurrants, but they offer during the season a convenient storage place for fresh fruit prior to processing. Even in the case of single-floor buildings no deep excavations are needed to provide for lofty cellars, because it is always advisable to elevate the ground floor; it is almost impossible to keep a factory clean where the ground floor is on street level. Where rail connection is available it is, at any rate, necessary to elevate the ground floor to the level of the ramps.

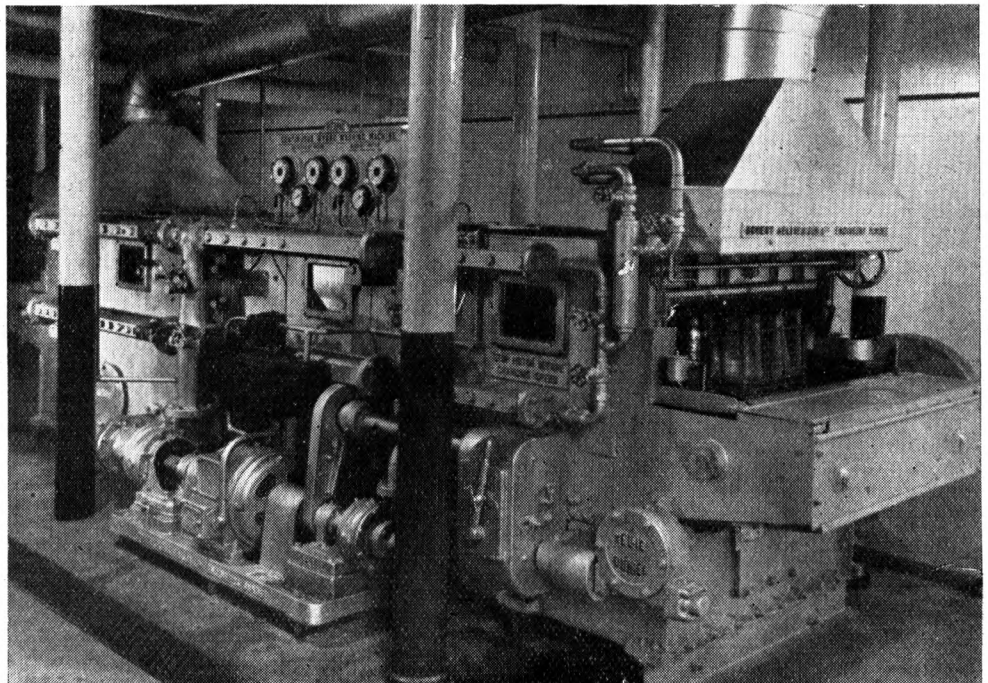


45 cwt. capacity Sugar Melter and Mixer with Water Pre-heating and Calibrating Tank.

Courtesy of Robert Kellie and Son, Limited



Battery of Rapid Boiling Pans with Juice Storage Tanks above, and Automatic Pan Charging at bottom left-hand corner. *Courtesy of Robert Kellie and Son, Limited.*



Hydro-Electric Continuous Washing and Delabelling Machine for jam jars and all kind of containers not exceeding 16 ins. high, with two treatment periods. *Courtesy of Robert Kellie and Son, Limited.*

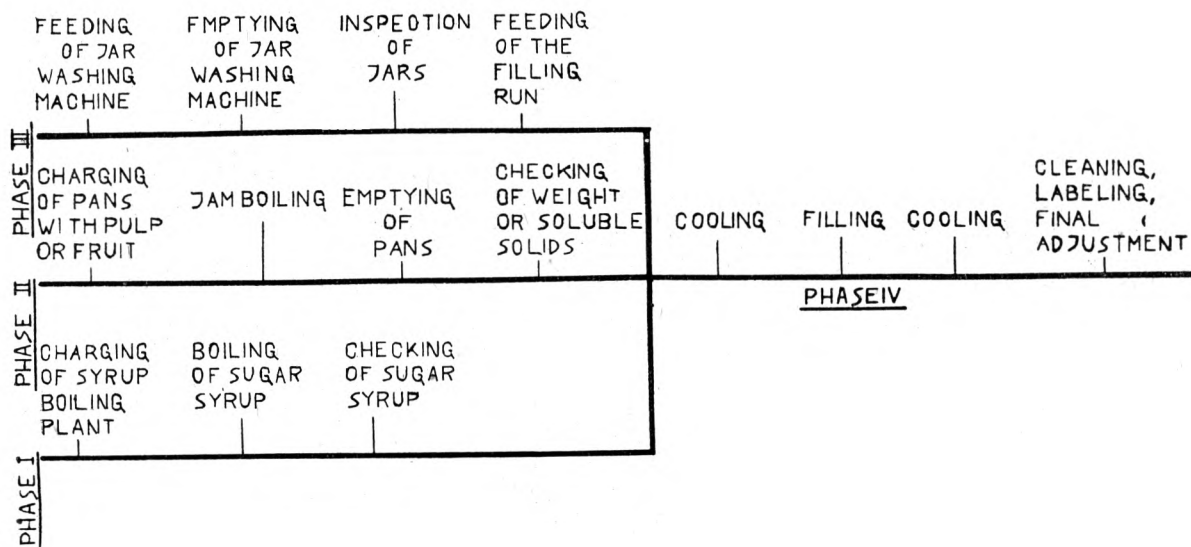


Fig. 1.

Good ventilation is of great importance. The accumulation of vapours generated by boiling pans, washing machines and cooling equipment is a great nuisance in many factories. Where pulp containing SO_2 is used, the disposal of vapour becomes an absolute necessity for reasons of health. One way of effecting this is the introduction of hot dry air. This is not as simple as it might appear. In cold weather the opening of doors even for a very short time causes the production of vapour and the current of cold air is drawn into neighbouring rooms, causing the same trouble there. The vapour gathers first below the ceiling, and the safest way of disposing of it is by using hoods in addition to dry hot air. These hoods are connected with air shafts. If used for boiling pans they are usually of conical shape in size of approximately $1\frac{1}{2}$ square yards at the bottom part. They should be fixed about 2 yards above the floor.

Lay-out for Continuous Production

Modern mass production is based on two main principles:

- Continuous processes.
- Division of labour.

It is proposed at this stage to deal only with jam production and not with the preparation of the raw material.

An ideal process of production is one where a continuous flow from the raw material to the finished product can be maintained. This continuity should be applied both in time and space; that is to say, the different phases of the production should be as closely linked together as possible.

Fig. 1 shows four main phases of jam production. In some factories where sugar in solid form is used phase 2 and 3 are actually one. In other factories certain manipulations are again mechanised or omitted, but generally speaking in all factories jam production contains two or three parallel running phases which finally emerge in Phase IV.

Wherever possible, use should be made of gravity. If the gravity principle cannot be employed, belt or conveyor systems are used. In single floor buildings it is necessary to use platforms. In this way it is possible to elevate the sugar boiling plant, and to raise the intake of pulp over ground floor level. Where jam filling machines are used, it is possible to sink the jam cooling and reception tank into the ground.

The boiled jam can then be tipped straight from the bogies into the cooling tank instead of being lifted by hand or pulley. Factories whose main lines of production are fresh fruit jams, or those which specialise in a few varieties, naturally require special lay-outs. Where large quantities of fresh fruit have to be disposed of in the shortest possible time, it is necessary to combine the pulping or juicing process with the rest of the production. Recent years have witnessed a great development on these lines, but it is a fact that high mechanisation means some sacrifice of adaptability.

Methods which are well suited to a large and sustained production output may prove too costly for medium or smaller factories. Small factories have one advantage, that of being able to pay better attention to the individual requirements of their customers, to produce high quality specialities; and they are also in a better position to adapt and change production methods. This is certainly not the case with highly mechanised plants built specially for mass production. Keeping this in

mind, the lay-out of jam factories has always to be adapted according to the peculiar type of production.

Fig. 2 shows the lay-out of a factory of medium size placed in a single floor building. The capacity of this plant is approximately 10 to 12 tons of jam per day. The syrup boiling plant is on a 10-foot platform and the solid sugar is brought up by an elevator. The eight boiling pans are also slightly elevated to allow the bogies to be tipped into the cooling tank, and from there the jam flows into the reception tank of the filling machine.

A building with two floors and more could be adapted in the following way: The syrup boiling plant and sugar store may be placed on the second floor, the jam boiling room on the first floor, and the filling, cooling and store room on the ground floor. A platform lift carrying 1 ton at a time is used to bring up fruit, pulp and sugar. This inconvenience is balanced by certain advantages.

Firstly, the ground floor acts a kind of filter so that the jam boiling can take place under ideal conditions of cleanliness. Secondly, gravity can be used in almost all other phases of the production process. Thirdly, elevated jam boiling rooms are of advantage from the point of view of steam economy. In the case described above it is necessary to use boiling pans with bottom discharge valves. The boiling jam is discharged through the valves into funnels, which in turn discharge the jam through a pipe into the reception tanks or coolers below.

If more than two floors are available the additional space can be used for stores, offices, etc. If possible a special building should be provided for the boiler house and for pulping. If no special buildings are available, at least a special department apart from the jam department should be found for pulping; the cellar could be used for the boiler plant.

Steam Supply

A steady steam supply of uniform temperature is of the utmost importance, as both boiling time and boiling temperature have a direct influence on the quality of jam. It is a rule that the lowest point of the factory should be chosen for the boiler-house, and it is also essential to choose the right size and type of boiler; if too large it will be uneconomical, and if too small it will have an adverse effect on the output and quality of the jam. The approximate requirements for the boiler can be found in the following way: The average steam consumption of most of the machines used in jam production is known. After having found the total maximum consumption figure of steam used by all machines per hour, allowances have to be made for radiation, condensation, leakages, etc. This figure being known, the size of the boiler can be calculated after the formulae $H = \frac{S}{s}$ square yards.

H=required heating surface of the boiler; S=required total amount of steam per hour in pounds; s=pounds of steam generated per hour and per square yard of heat-

(Continued on page 51)

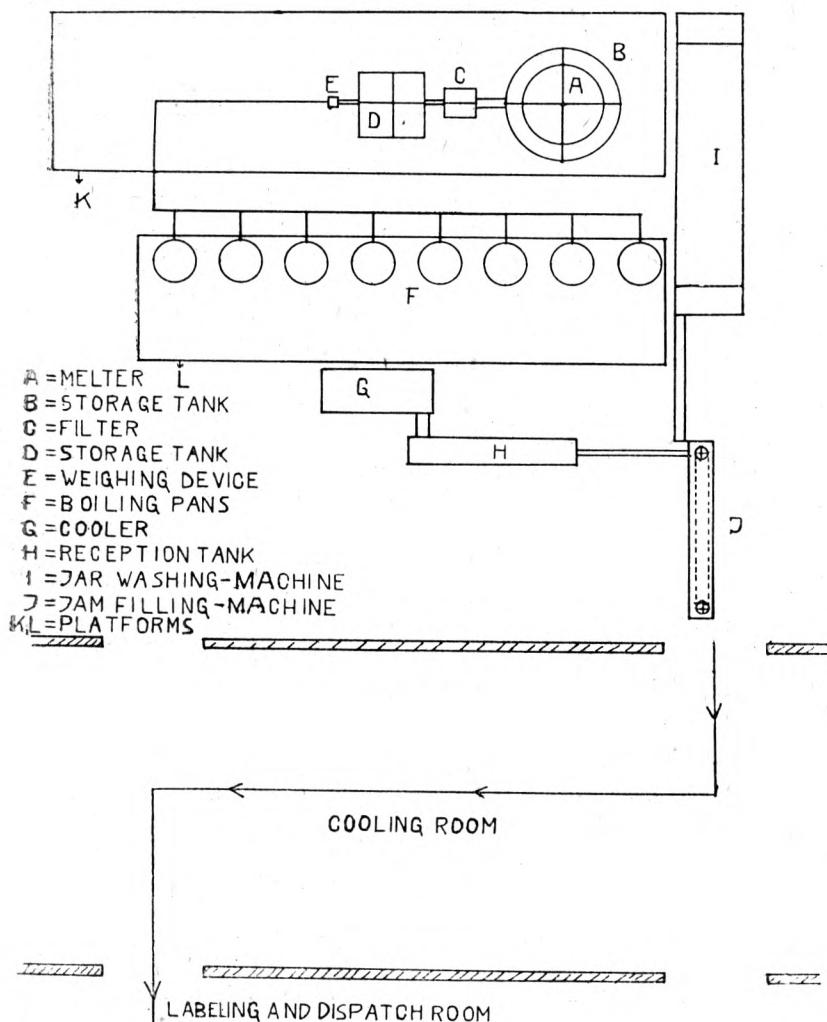


Fig. 2.

Ice Cream Powders and Mixes

Ever since the ban on the manufacture of ice cream has been lifted members of the industry have been eager to obtain information to enable them to resume production. This article presents some practical formulæ for use under the present allocation system for ingredients operated by the Ministry of Food.

SPECIALLY CONTRIBUTED

AS A LARGE proportion of ice cream makers have at present only an allocation of sugar, and no fat or skimmed milk powder, it is not surprising that a strong demand for ice cream powders has arisen.

Before the war the usual practice in connection with these powders was to leave the addition of either hot or cold milk to the ice cream maker; sometimes the sweetening was also left to him. Present conditions necessitate the reversal of these conditions. The milk must be included in the ice cream powder and the sweetening can in nearly all instances be left to the ice cream maker.

Allocation of Materials

The Ministry of Food announced in November that allocations of sugar and roller process skimmed milk powder would be granted to manufacturers of ice cream powder on the basis of their datum usage; but if these powders are to be of use to traders who have only an allocation of sugar they must contain a larger proportion of milk powder than before the war. It would be monstrous to expect any man to make a wheat flour mix while his competitors are marketing a product of pre-war food value.

The Ice Cream Alliance placed before the Ministry proposals for increasing the allocation of skimmed milk powder to manufacturers of ice cream powders so as to help some of the luckless traders. Trade organisations believe that these proposals are likely to be accepted by the Ministry. Consequently, although some of the leading powder



Behind the service counter at Forte's Ice Cream Parlour at Sandlands, Bournemouth.

manufacturers are still awaiting their licences, the picture as a whole is considered sufficiently clear to justify the publication of formulæ.

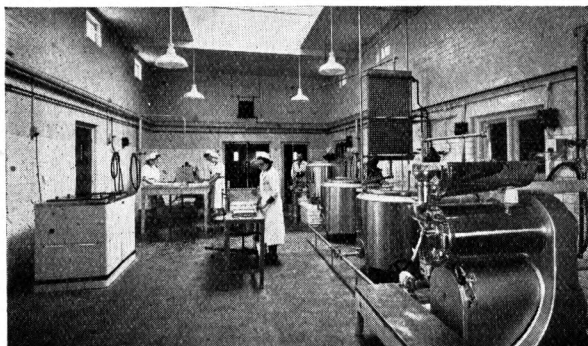
New Ingredients

The use of some ingredients in ice cream powders is still prohibited; others are in short supply or unobtainable. Against this some new ingredients are available. Full-cream milk powder, an ingredient of some of the best pre-war cold process ice cream powders, is prohibited under the Use of Milk (Restriction) Order, 1941. Saccharin is also barred to all the commercial manufacturers of I.C.P. Gelatine is not suitable for stabilising cold mix powders and is open to objection in hot process powders. Yet one firm, having ingredients on their hands, asked the author for a formula for a cold process powder containing both saccharin and gelatine!

As most of the requests for I.C.P. formulæ are for the cold process, these will be considered first, although the general view of the trade is that, from a bacteriological point of view, hot process powders are preferable.

Pre-War Cold Mix Powder

A standard pre-war cold mix powder was more or less as follows:



Processing room at the Erimus Ice Cream Co.'s factory at Middlesbrough.

Sugar	..	..	..	1½ lb.
Skimmed milk powder	..	..	8 oz.	
Gum tragacanth	..	..	1 oz.	
Egg yolk powder	..	..	1 oz.	
Vanilla flavour	to taste.			

This powder was stirred into 1 gallon of cold milk and then strained before processing.

All these ingredients are still available except egg yolk powder, but this can be readily replaced by dried whole egg, the albumin of which assists the whipping properties of the mix. The S.M.P. now available is, of course, roller process, whereas before the war the use of the spray process product was practically universal.

New Formulæ

The 1945 formula must, if possible, contain the milk which the user of the powder will probably be unable to provide; and as the milk fat normally obtained from the liquid milk will be completely missing the addition of a few drops of butter or cream flavour is desirable. The formula therefore becomes:

Sugar	..	..	..	1½ lb.
S.M.P.	..	..	..	1 lb.
Gum tragacanth	..	..	..	1 oz.
Dried whole egg	..	..	..	1 oz.
Butter flavour	..	..	few drops.	
Vanilla flavour	..	..	few drops.	

Other gums may be used as alternatives to gum tragacanth. Several kinds are in fairly good supply. The one chosen must be finely powdered.

Vanilla is the most usual flavour used in I.C.P. This does not prevent the user from changing the flavour of the finished ice cream by adding another flavour prior to freezing. The presence of the vanilla will enhance rather than detract from the flavour of the final product. Thus the vanilla leaves the user free to choose his own flavour; at the same time the strength of the vanilla should be sufficient to permit of it being the sole flavouring. Vanilla is, of course, far the most popular of all ice cream flavours.

Flavouring may be added to the dry ingredients in powder form or liquid flavour may be sprayed over the ingredients. Very little will be required, but the actual quantity depends upon the strength of the essence used. The correct quantity is best ascertained by the trial and error method, and new tests should be made with every consignment of essence used, as there is less uniformity among flavourings now than in normal times. The butter or cream essence is added in a similar manner.

As a number of ice cream makers have an allocation of sugar, there would seem to be a considerable market for unsweetened powders. All that is necessary is to omit the sugar from the above formula.

Fat Content

The weak point about these powders is the fat content. The user has lost his milk fat and the powder manufacturer cannot replace it. The only fats in the powder are those contained in the dried egg and the butter essence, but the quantity of the latter is negligible and the fat in egg yolk is different from that of margarine.

Some I.C.P. manufacturers may wish to reduce the quantity of sugar in the powders, but general opinion favours the retention of the full amount so as to avoid loss of total solids in the final product. If it were possible to use glucose or dextrose a reduction in the sugar (sucrose) content might be possible without damaging the ice cream, but neither of these alternative sweeteners is available.

One ice cream powder manufacturer, the author is informed, is marketing a cold process powder that contains as much as 8 per cent. of margarine. Such a powder marks a step along the path of progress. The finished product prepared from it should bear comparison, in food value, with those made from ordinary ice cream mixes.

During the war dehydrated butter fat has been produced in Australia. Hopes are entertained that this product will be found suitable for incorporation in post-war ice cream powders and possibly in ice cream mixes.

Hot Process Powder

The position in regard to hot process ice cream powders is complicated. A normal standard powder of this type for processing with 1 gallon of milk is as follows:

Sugar	..	..	..	24 oz.
Cornflour	..	..	..	6 "
Egg yolk powder	..	..	..	1 "
Vanilla flavour	..	..	..	to taste

As the user of the powder no longer possesses any liquid milk, and at present has no allocation of skimmed milk powder, the I.C.P. manufacturer is faced with the problem of supplying both the cornflour and the S.M.P. For 6 oz. of cornflour about 18 oz. of S.M.P. are required, but the difficulty is that, while the cornflour must be boiled by the user, trouble may arise if the skimmed milk powder be boiled. Some ice cream makers believe that, as the Ministry of Food has agreed to allocate additional quantities of S.M.P. to powder manufacturers, and also to grant them allocations of sugar, a good plan may be to supply the ice cream powder in two parts. One would contain the sugar and cornflour, and would be boiled; the other would contain the skimmed milk powder, dried whole egg and flavouring and would not be boiled. It would be added gradually after the hot mix had cooled to about 100° F. Some makers favour mixing the S.M.P. and other ingredients with a portion of the water

(made lukewarm) before adding them to the mix that has been boiled.

The cornflour can be replaced by an equal weight of custard powder or blancmange powder if desired. This will impart colour as well as flavour to the final product.

One or two hot process powders have appeared on the market, but the general feeling among ice cream makers is that such powders are unlikely to regain their pre-war popularity until the use of liquid milk is again permitted in the manufacture of ice cream. In view of all the circumstances the author does not feel justified in recommending a hot process I.C.P. at the present time.

Reconstituted "Milk"

As the majority of the users of liquid milk do not possess an emulsifier, the Ministry takes the view that many of these people could not use margarine, and that if it were allocated some of it might find its way into the black market. That is said to have happened in 1942, when margarine was allocated to ice cream makers who had a datum usage of cream. The Ministry proposes to allocate fat and S.M.P. in the form of reconstituted "milk" to manufacturers who at present have only a sugar allocation.

The intention is to issue the actual fat and S.M.P. to certain ice cream factories and dairies that have the machinery with which to reconstitute them into liquid "milk." The ice cream makers will be given permits to buy specified quantities of this "milk" based on their sugar allocations. In this manner it is hoped to overcome the present anomaly.

A Colossal Task

The Ministry is faced with a colossal task in preparing such a scheme. It will affect probably 20,000 ice cream makers. The quantities of fat and S.M.P. to which every firm will be entitled have to be calculated; the permits have to be prepared, arrangements have to be made for reconstituting these ingredients; and containers must be provided for handling the "milk." All this work must be done under serious staff difficulties. Some local Food Offices have lost their records of datum usage of sugar through enemy action and other causes, and few of the ice cream makers themselves can provide proof of liquid milk or sugar purchases six to seven years ago. It is therefore considered improbable that the scheme will be ready for operation before April.

That date should be convenient to a large proportion of these firms, many of whom normally make ice cream only during the summer season. The British Standards Institution has under consideration the question of a standard container for the reconstituted "milk." In round figures, 10 lb.

of skimmed milk powder and 4 lb. of margarine to 10 gallons of water will give a product similar to cow's milk in fat and milk solids-not-fat. The price at which it could be sold to ice cream makers is expected in trade circles to be not less than 2s. per gallon. That figure should enable them to make a reasonable profit on their finished ice cream. Most of these firms paid about 1s. 6d. per gallon for liquid milk before the war. The reconstituted product may be supplied in concentrated form for purposes of convenience and economy. The user would be able to dilute it so as to make it equivalent to normal milk, or he may use it in its concentrated form so as to produce a rich ice cream.

The Ministry of Food cannot be expected to allocate S.M.P. to small firms in this reconstituted form and also allow them to buy ice cream powders that contain extra quantities of S.M.P. It is therefore believed that any concession the Ministry may decide to make to I.C.P. manufacturers in regard to allocations of skimmed milk powder may be revised when the reconstituted "milk" scheme comes into operation.

Estimates of Fat and S.M.P.

Until the reconstitution scheme has been prepared no estimate can be formed of the total quantities of fat and S.M.P. that will be required on the basis of present allocations. National stocks of these ingredients are not unlimited. If it should be found that allocations cannot be made on the present basis to the 20,000 or 30,000 users of liquid milk, the trade association will ask that the present allocations be modified so as to permit every ice cream maker to receive his fair share of the available supplies.

Ice cream makers who have allocations of fat and skimmed milk powder are estimated to represent 10 per cent. of the total number of manufacturers, but 60 to 70 per cent. of the total gallonage. Many of these firms are using a mix that compares with their pre-war products, the main difference being that margarine takes the place of butter. Demand for ice cream is at present abnormally good for the time of the year and some manufacturers have deemed it prudent to reduce both fat and sugar contents compared with those used before the war. In other cases these reductions are due to necessity. In areas where the population has declined because of war conditions the fat (and, therefore S.M.P. too) allocation has been reduced below the normal proportion of 80 per cent. of datum usage but some firms fail to understand how their actual quantities are determined. The following example explains the calculations.

Let it be assumed that a firm's datum usage of fat for the 8-week allocation period was 125 lb. on the basis of an 80 per cent. allocation, they would receive 100 lb. on the assumption that the population has remained unchanged. Let us suppose that

the population has fallen to 70 per cent. of the pre-war figure. The firm would be entitled to only 70 per cent. of the 100 lb. (not 70 per cent. of 125 lb.). The allocation would therefore be 70 lb. compared with a datum usage of 125 lb.

Some firms that used 100 per cent. vegetable fats in the datum period are now being allocated margarine. How does an 80 per cent. allocation work out in this case in view of the fact that margarine contains 84 per cent. fat and 16 per cent. water? Every cwt. of vegetable fat used in the datum

period was equal to $\frac{112 \times 100}{84}$ lb. of margarine, or 133 $\frac{1}{3}$ lb. An 80 per cent. allocation in the form of margarine would therefore be $\frac{133\cdot3 \times 80}{100}$ lb., or 106 $\frac{2}{3}$ lb.

Following is a useful formula to make 1 gallon of mix of 8 per cent. fat content:

S.M.P.	..	..	..	17 $\frac{1}{2}$ oz.
Margarine	..	..	..	16 $\frac{1}{2}$ oz.
Sugar	..	..	..	24 oz.
Gelatine	..	..	..	1 oz.
Dried whole egg	..	..	..	1 oz.
Flavouring	..	..	..	few drops.
Colour	..	..	..	few drops.
Water	..	..	..	5 $\frac{3}{4}$ pints.

If vegetable 100 per cent. fat be used in place of margarine the quantity should be reduced to 14 oz. Many manufacturers consider not only colour but also butter (or cream) essence to be very desirable in mixes that do not contain butter. The amount of colour required must be ascertained by experiment; only a few drops of butter essence are necessary.

Fortunately for the welfare of the ice cream industry as a whole, the majority of firms are making the best quality ice cream they possibly can. They aim to win the public esteem and support by offering a very nutritious and palatable product at a fair price. The author knows of a number of instances in which a 12 per cent. fat product is offered. The following is a typical formula, again for 1 gallon of mix:

S.M.P.	..	..	..	18 oz.
Margarine	..	..	..	26 oz.
Sugar	..	..	..	24 oz.
Gelatine	..	..	..	1 oz.
Dried whole egg	..	..	..	1 oz.
Colour	..	..	..	few drops.
Flavour	..	..	..	few drops.
Water	..	..	..	5 $\frac{1}{2}$ pints.

In some cases the sugar content is being reduced, partly because stocks are short, and partly because the public have become accustomed to having their food less sweet during the war. As the sugar allocation is higher than in the 1940-42 period, manu-

facturers are pleased to keep above the level of 20 oz. per gallon of mix that was popularly used at that time. Some firms are using 22 oz. of sugar per gallon of mix and adding 1 or 2 oz. of high-fat soya flour so as to maintain food value and total solids.

In spite of restrictions on a number of ingredients there is still room for manufacturers to exercise their ingenuity. As regards stabilisers, for instance, a Ministry of Food licence is necessary in order to purchase more than 5 cwt. of gelatine in a quarterly period. Few firms will require more. But sodium alginate and Irish moss (gelozone) are available; and Colloid K2 is obtainable in limited quantity.

The policy set by a number of leading manufacturers of offering the public the best possible mix at a reasonable price is to be commended. Ice cream is, at the moment, in the public mind, and the industry has a golden opportunity of winning the permanent support of a large clientèle. Every manufacturer who has his own reputation and the welfare of the industry at heart knows that that can only be done by giving the public a fair deal.

Jam Manufacture

(Continued from page 47)

ing surface of the boiler. The proportion of grate area to heating surface is at least 1:30 using inferior fuel; 1:45 to 1:60 using high grade fuel.

Suitable boilers for jam factories are the Lancashire and Economic shell type boiler, as they do not show great fluctuation in steam pressure at varying loads. This is a very important point, especially during the fruit and pulping season. Modern appliances, such as the mechanical stoker and economiser, are extremely useful. Mechanical stokers are a profitable proposition for both small and large plants. Hand firing requires highly skilled workers, whereas mechanical stokers can be worked by unskilled labour, while they have the additional advantage of being more economical and making smokeless combustion possible; they assure a larger output, and maintain the fuel bed in right depth.

Another fuel-saving device is the economiser used for the preheating of feed water. Raising the temperature of feed water by 11 degrees Fahrenheit increases the boiler efficiency by 1 per cent. It is therefore obvious that use should be made of all heated water from cooling plants, washing machines, condensed water, etc. Also, particular care should be taken with the steam transmission. All steam pipes and jackets should be insulated, valves and joints regularly inspected.

(To be continued)

The Baking Industry

Progress in 1944

J. STEWART, *National Bakery School.*

THE Prime Minister in a recent speech told us that the war in Europe might possibly last until the summer of 1945. With the speed of events since D day many people thought that peace might possibly come before the end of 1944. The baking industry has, optimistically, been looking forward to the end of hostilities, so that many of the problems that have beset it will be easier, and when there will be a measure of freedom from so many controls. It will be startling news indeed when we hear that some of the controls have been rescinded, but in the meantime the Ministry of Food has still got as firm a grip on the baking industry as ever.

New Orders

There has been quite a spate of Orders from the Ministry of Food affecting the baking industry during the past year, among which figure some affecting its basic raw material—flour. Early in 1944 there was an Order consolidating the Flour Order of 1943 and its three amending Orders. This also raised the price of self-raising flour sold by flour millers by 1s. per sack. Early in May the proportion of home-grown wheat to be included in all blended grists was reduced to 50 per cent., and in July to 33 per cent.

Another amendment early in October decreased the rate of extraction of National flour from 85 per cent. to 82½ per cent., and increased the price of flour by 1s. 9d. per sack. The object of this reduction, we were told at the time, was to improve the National bread, and the increased price only affected flour used in confectionery, since that used in bread production was subject to increased subsidy to recover the extra cost. Early in 1945 the rate of extraction was further decreased 80 per cent.

Later in October the admixture of imported flour was increased in all areas from 5 to 7½ per cent., and at the end of October it was again increased to 10 per cent. This increased admixture of imported flour had a beneficial effect on the colour and strength of the National flour. Probably one of the main reasons for this increase of admixture of imported flour in the National flour was the condition of the new season's grists. Owing to the conditions under which home-grown wheat was harvested last autumn, there was a tendency for the grists to yield flour with a maltose figure higher than normal. Bread bakers were warned about this tendency and were advised to watch their flour, and be ready to discontinue the use of malt products as bread improvers. It is a well-known

fact that a high maltose figure in flour will result in a quicker ripening of the dough and a softening of the gluten during fermentation, and the addition of malt products would intensify this tendency, causing the bread to have a damp sticky crumb, and to take on too much colour during baking. It was also recommended that to obtain loaves that would bake out satisfactorily, a fermentation system should be adopted that would ensure well-aerated doughs, with a vigorous gas production during final proof.

The expected trouble did not develop seriously when the ratio of imported flour in National flour was increased, and so long as bakers keep a vigorous fermentation and keep the quantity of salt used up to 4½ or 5 lb. per sack, they can get good bread of excellent volume, especially if such bread improvers as lecithin and soya flour are used to give a better fermentation tolerance. There is no doubt that the National bread being produced at the present time is much better both in volume and colour than that being produced a year ago.

Flour Confectionery Orders

Quite a number of changes have taken place in flour confectionery during 1944. Early in March the Ministry of Food made a new Flour Confectionery Order to take the place of the Cake and Flour Confectionery (Control and Maximum Prices) Order, 1943. This new Order amended the maximum price provisions, introduced a minimum fat and sugar content for goods within certain price ranges, and extended the scope to include "Trifles," ready-made puddings and uncooked pastry. At the same time provision was made whereby caterers need not hold a licence to manufacture flour confectionery if they serve it as a meal or part of a meal in the course of a catering business.

The maximum price for goods containing less than 14 per cent. fat and sugar was reduced to 8d. per lb. and the maximum price for other goods containing over 14 per cent. fat and sugar was reduced from 1s. to 10d. per lb. This figure can still, however, be exceeded if the seller can establish that he is not charging more than three times the ingredient cost, but the maximum price of 1s. 6d. per lb. remains.

The maximum prices applied to "Trifles" and ready-made puddings, but the prohibitions on additions after baking do not apply to "Trifles." The maximum price for uncooked pastry is now 9d.

per lb. and a minimum fat content of 25 per cent. is now prescribed. That means that uncooked puff pastry sold by confectioners should contain a minimum of 10 oz. pastry margarine per lb. of flour.

No alteration was made in the maximum fat and sugar allowed in flour confectionery. It still remains at 45 per cent. when either the fat exceeds 20 per cent. or the sugar exceeds 30 per cent. Additions after baking are prohibited with two exceptions—namely, the addition of one substance as a filling to Swiss rolls and sponge sandwiches.

This new Order resulted in a lower price for the cheaper types of flour confectionery, but did not affect the price obtainable for the better quality products which the Ministry of Food are anxious to encourage.

Dried Eggs in Confectionery

During the past year there has been plenty of dried egg available for confectionary use, and the Ministry of Food have been anxious that the trade make more use of this material to improve the nutritional value and general quality of flour confectionery.

The Ministry of Food was advised, following tests using higher proportions of dried eggs, that increased usage was practicable, and that the results obtained were extremely satisfactory. They suggested that the best method of introducing additional dried egg into slab cakes, pound cakes and sponge goods is to reduce the proportion of water used for reconstitution from 3 parts water to 1 part egg to 2 parts water to 1 part egg. Dried egg can also be used with advantage in all other types of flour confectionery at the rate of $\frac{1}{2}$ lb. to 1 lb. dried egg per gallon of water used—i.e., used in place of reconstituted milk. A 10 per cent. solution of dried egg will make a satisfactory egg wash for all confectionary goods.

Many confectioners may think that it is not practicable to use more dried egg without having an extra allocation of sugar and fat, but after conducting some experiments it has been found possible to use extra egg as a fat extender. It makes a much better fat extender than many of the dubious products now on the market, in that it enriches and gives a better food value to the products, besides giving them a better appearance and better volume.

The method advocated, and which has proved successful in saving fat, is to reduce the fat content of the cake batters by 25 per cent., and replace it with $12\frac{1}{2}$ per cent. soya flour and $12\frac{1}{2}$ per cent. dried egg reconstituted with water, and add extra moisture up to the weight of soya flour used. By doing this there is an increased yield of cakes from the batters which offsets the increased cost of the extra eggs used; the cakes produced having an improved appearance and volume and naturally good keeping qualities. This method of saving fat and gaining an increased production has been

tested both in good quality and cheap quality cakes with equally good results.

Recipe for Good Cakes

6 lb. margarine.
2 lb. fat.
9 lb. sugar.
8 lb. reconstituted egg.
16 lb. flour.
6 oz. baking powder.
6 lb. milk.
8 lb. fruit.

This mixture is about the best quality that can be produced at the present time to comply with the Flour Confectionery Order, 1944. It contains fully 16 per cent. fat and about 29 per cent. sugars and costs about 6d. per lb. to produce. It should yield about 50 lb. cake.

Replacing 25 per cent. fat with Soya Flour and Eggs

4 lb. margarine.
2 lb. fat.
1 lb. soya flour.
9 lb. sugar.
12 lb. reconstituted egg.
16 lb. flour.
6 oz. baking powder.
7 lb. milk.
8 lb. fruit.

This mixture also costs about 6d. per lb. It should yield at least 53 lb. cake. The fat content is nearly 14 per cent. and the sugar content is around 28 per cent. Such a cake mixture produces infinitely better cakes than are being produced by the majority of confectioners at the present time and shows the maximum profit when sold at 1s. 6d. per lb.

There would not be so much grumbling by the general public if such cakes were regularly produced.

The same principle applies in most recipes that have been tested and given better results than the so-called fat extenders.

Cakes Costing 5d. per lb.

8 lb. mixed fats.
14 lb. sugar.
2 oz. salt.
8 lb. reconstituted egg.
28 lb. flour.
1 lb. baking powder.
16 lb. milk.
8 lb. fruit.

This mixture produces about 75 lb. of cake to sell at 1s. 3d. per lb.

Saving 25 per cent. fat.

6 lb. mixed fats.
14 lb. sugar.
1 lb. soya flour.
2 oz. salt.
12 lb. reconstituted egg.
28 lb. flour.
1 lb. baking powder.
17 lb. milk.
8 lb. fruit.

The preceding recipe has been altered to save 25 per cent. fat. This mixture should yield at least 78 lb. of cake. It has a fat content of about 9.4 per cent. and a sugar content of about 25.4 per cent. The cost is nearly 5d. per lb.

It can be seen from the foregoing recipe that there is a saving of 25 per cent. fats when use is made of egg and soya flour as fat extenders. There is a slight increase in the yield of cakes, which incidentally means a slight saving of sugar or a bigger turnover with the sugar supply. Other well-balanced recipes can also be altered in a similar manner, to save the fat and give a vast improvement in the quality and food value of the cakes. These recipes can also be utilised to produce plain cakes when there is a shortage of fruit.

Increased Allocation of Preserves

As from August last the allocation of preserves for manufacturing users was raised from 50 per cent. of basic usage to 75 per cent. of basic usage. Owing to the shortage of the more popular types of jam, flour confectioners were requested to take as high a proportion as possible of their preserves as marmalade. This made an excellent change, since most confectioners could use marmalade in making marmalade tarts, and also use some marmalade to flavour their cakes, and incidentally save some of their sugar ration, while giving the customers a distinctive and agreeable change with some new types of goods.

Many of the larger bakeries received an allocation of butter-fat for a period during the past year, which set them the problem of making the best use of it, but once again this has been stopped, since no more supplies are available at present.

Various bakeries suffered damage during the summer months in Southern England through enemy action, but production was never very seriously threatened.

Glycerine and Milk Powder

The Ministry of Food announced in August that glycerine was freed for general use in confectionery. Many confectioners have taken advantage of this to try and improve their cake production by using a little of it in their cake mixings. Some people try to use it as a substitute for fat or

sugar, but they should clearly understand that it is not a substitute for either of these substances. But when 1½ to 2 oz. glycerine per lb. of fat is employed in cake batters, it helps to keep the cakes moist and fresh for a longer period owing to its hygroscopic properties.

The release of skim milk powder for use in making biscuits and flour confectionery was welcomed by the trade. Bakers are now entitled to 100 per cent. allocation of their datum usage. The use of skim milk in confectionery undoubtedly helps to improve the general appearance of the products.

Manpower—A Welcome Development

Last July the baking industry came within the field of the Essential Work (General Provision) No. 2 Order. Many of the larger bakery firms took advantage of this Order in order to hold on to their available labour. A welcome development in the efforts to improve the manpower situation in the industry is evident in that the Ministry of Labour have agreed to attempt to locate ex-bakers at present occupied in other work, and to offer them transfer back to bread-making. Secretaries of local associations have been requested to co-operate with Divisional Food Officers in tracing skilled bakers now in other industries, since there is an urgent need for different classes of workers, and members of the trade are urged to act without delay in furnishing information concerning men, now outside the trade, who are qualified bakers. Throughout the war the manpower position has created many difficulties for the baking industry, and this indication that some action is being taken to try and get some men back into the industry will be generally appreciated.

Correspondence Courses

A recent development of education for bakers is the starting of correspondence courses for members of the Armed Forces. It is understood that well over 400 applications have been received for the correspondence courses in breadmaking and confectionery. Those members of the Armed Forces taking the correspondence courses are studying the technicalities of the trade and many of them are hoping to be able to take the City and Guilds examinations in breadmaking and flour confectionery. Arrangements are now being made to allow a number of them to take the examinations this year with a proviso that they take the practical examination later on. With so many people now studying the theoretical side of the baking industry, we should have some good men when the war is finished to raise the industry to a higher status. Technical schools this session all over the country report a big influx of new students and many of them are now holding classes for bakery trainees or apprentices. The more enlightened

employers are sending their young employees during working hours for one whole day or two afternoons per week to the bakery schools for technical training, thus forestalling the new Education Act which in due time will compel them to send their junior employees under 18 years of age to part-time schools for two periods per week. This technical training of bakery trainees will give the future operatives of the trade a useful background to enable them to progress and take a greater interest in the trade.

Post-War Planning and Research

The Bread and Flour Confectionery Post-War Planning Committee recently submitted their report to the Ministry of Food. This report is well worth studying and shows a progressive spirit for the baking industry. They recommend among other things that the extraction of flour from wheat should be progressively reduced; that the allocation of raw materials should be stepped up as soon as possible; that the baking industry be used as the principal means for the equitable distribution of increased supplies of sugar, fats, fruits, preserves and chocolate; that the restrictions on the quantity of fat and sugar content of confectionery and additions to goods after baking be eased as soon as supplies of materials and labour permit; that restrictions on bread shapes be removed; and that bread and flour prices be adjusted to enable the bread and flour subsidy to be withdrawn. It would mean the end of controls and a big incentive to the industry to produce much better quality bread and cakes if all these recommendations were brought into effect. It must be realised that it will take a long time before all the controls are removed, but we look forward to a gradual removal of the more onerous of the restrictions as soon as conditions permit.

Research in the baking industry is assuming ever greater importance. This subject has been well ventilated during the past year, and while most bakers realise the growing need for it, opinions are divided as to what form it should take. Discussions have taken place regarding the financing of a research scheme and its scope. Some bakers want to restrict it to members of the National Association, while the more enlightened members want to set up a research institute which would cover the whole industry. Since £30,000 has already been raised from the members of the N.A. there is no doubt that some sort of research institute will be formed, but it will be interesting to see whether it will take in all the baking industry or not, and work with the government Department of Scientific and Industrial Research.

The foregoing indicates some of the means whereby the industry has emerged from the Slough of Despond in which it has found itself in recent years, giving the promise of progression and improvement for the future.

Properties of Foods

A LABORATORY system has been designed to measure the specific odour, taste and visual properties of foods and beverages and also the preferences of the typical consumer, says a report to the American Chemical Society by E. C. Ziegler and E. H. Schofield of Joseph E. Seagram and Sons, Inc., Louisville, Ky.

Personnel are specially trained for the purpose of determining the degrees of difference and flavour characteristics. Control and improvement of the products are partly dependent on the responses of these groups. To determine the degree of the product's palatability in a relative and absolute sense, the judgments of typical consumers are utilised.

"Research has shown that specially designed equipment was necessary to conduct the food and beverage studies," the report explains. The control of the optimum temperature of the samples, amounts, timing intervals and concentration was required; moreover, the influence of the technicians on the observers' judgments had to be eliminated.

The equipment designed to satisfy these requirements controls the samples at any temperature desired, contains a bank of forty-eight flasks which dispense exact amounts, has an annunciator which records the judgment of the observer, and is constructed so that the technician and observer are completely separated. Timing is controlled by use of turntable device. Other possible sources of variation in procedure, as glassware, colour and rinsings, are held constant.

"Typical of some of the types of studies using the equipment of psycho-chemical investigations are the following: (1) The effect of each plant operation from the test tube to the package on the quality of the final product; (2) the direction and degree of change for product improvement, and (3) the amount of deviation of the material from standard product.

"Some of the methods measure the flavour intensity of products in terms of stimulus and differential thresholds. Tactual properties, relative neutralities, odour, taste, visual differences, absolute and relative preferences of foods and beverages are also determined. Correlations, such as quality with certain measurable chemical variations, are determinable by the methods.

"By way of illustration, the relationship between tactual properties (general sensibility) and taste preference may be studied. As an example, in a series of the same general type of alcoholic products, it was determined, using trained observers, that the samples had varying tactual values. It was also found, using the typical consumer and the same samples, that the preference rating increased as tactual properties decreased.

"In another typical investigation the trained observers' results showed that as a specific type of grain neutral spirit was added to a series of other alcoholic materials in increasing amounts, the product became 'lighter in character.' Other studies by typical consumers for the same products indicated that, with increasing amounts of grain neutral spirits, the preference steadily increased. The correlation was then utilised in determining future production procedures."

Continental Communiqué

The European food situation is obviously fluid and this report covers it, as judged by the author, up to January 10, 1945.

FROM A SPECIAL CORRESPONDENT

ONE of our prospective feeding problems, that of the displaced and homeless persons of the Continent, can now be viewed in its full dimensions. A high estimate gives their numbers as 20,000,000, assuming that they are all still alive or will survive the last bitter conflict. Approximately 10 per cent. may be women or children. There is no record on this side of the proportion of them dispersed in Balkan territories; but such as there are would be mainly Russian nationals, and these are probably being repatriated by the Soviet authorities without further formality. There were a few pockets of Russians and Poles in France and Luxemburg; and in Belgium a provisional survey reports some 8,000 displaced persons, Poles, Dutch and Russians for the most part. The conclusion is that the majority of them must be concentrated within the German frontiers.

In that case it will be a matter for the Allied High Commands to assemble them into camps for registration and inspection. An organisation of the nature of UNRRA could only intervene to assist the military commissions. But the process of repatriation must necessarily be a protracted one; and it is plain that the feeding of this vast "nation" of liberated slaves, scattered in their camps over the surface of the Reich, may later present a problem of some complexity.

Western Approaches

The pattern of German continental economy is now fraying along the whole extent of its fabric. But while it survived it served its purpose. In the western countries the soil generally seems to have been maintained in good heart; and the condition of the people at the time of liberation was probably better than it had been in 1942. The very fact that the Germans were calculating on a grain surplus for export from France and on heavy meat requisitioning has in some measure benefited the country. Harvesting was deliberately delayed by the farmers; as a consequence the Germans could not in 1944 lay hands upon the 800,000 tons of wheat and the 500,000 tons or so of other grains that they had been annually accustomed to remove from French soil. Presumably, too, they obtained little of the 280,000 tons of meat they had been expecting to requisition. It is true that the cattle population has been depleted, though there appear to be plenty of young stock, from which the herds may in time be replenished. The poor

hay harvest, however, and the lack of adequate shipping make the milk situation a serious one, especially for the urban communities.

Scandinavian Surmises

Norway, on the other hand, is reported to be in a bad state. Her relatively small population requires an annual import of bread-grains; and she is probably receiving far below her estimated needs. The potato harvest has not been up to standard; and it is mainly on potatoes and fish that the people have relied. Much of the coastal fishing fleet seems gradually to have been requisitioned by the Germans. Meanwhile the populations of the far north have been forced back upon the south and increased the demand on available food. The necessity of conserving root crops for human consumption must inevitably mean a slaughter of live stock; and this indeed seems to be already taking place. In the far north the Germans resorted during their retreat to widespread sabotage; and the only satisfactory element in the situation is the fact that they must have deprived themselves of large consignments of processed fish, upon which they had normally relied.

In Denmark, too, the production both of milk and bacon is on the decline, though the process is a far more gradual one. The sow population dropped between 1943 and 1944 from 259,000 to 195,000; and this must inevitably result in a lowered pork yield in 1945. It is estimated, indeed, that whereas by the spring of 1944 pork production had reached the high annual level of more than 175,000 tons, the production in 1945 will return to the 1942 figure of approximately 120,000 tons. In the year 1943 Germany had exported from the country some 67,000 tons of pork; and this level of export was probably exceeded in 1944. Such a drain on Danish food resources could not be continued through the present year without a serious restriction in the meat rations of the producing country; but this is scarcely likely to deter the Germans; and while the future course of the war is unpredictable, it is not impossible that they will attempt to maintain their own meat supplies by a large-scale slaughter of Danish stock. The decline in production may have been partly due to the restricted imports of feeding-stuffs from the Balkans; but it seems to have been due in no small measure to the deliberate slaughter of their own stock by the Danish farmers. Certainly, both here

and in the west the farmer has shown himself apt in concealment of stock and falsification of returns.

To revert to the position in the western countries of liberation, the live stock population in Belgium as in France is unquestionably well below its pre-war level, in the case of cattle probably by about 20 per cent. The stock surviving in the autumn was in fairly good condition, owing to the abundance of late grass. The feeding-stuff shortage is now, however, very serious; and it would be quite impossible to import fresh stock, at all events into Belgium.

The sugar-beet production of the west had been well maintained through the war; but the difficulties of processing the current harvest appear almost insuperable. Most experts doubt whether half the crop can be processed this season. The problem is mainly that of transport; but the problem of transport is complex. The beet might be conveyed to the factories, but here it meets the bottle-neck of a failure in the supplies of coal; and the failure in coal supplies is in part due to a failure in the delivery of pit props to the mining areas, again through the dislocation of internal transport. Fats, too, are very short in the west, though in a few producing areas there is probably a sufficiency or even a glut of butter and olive oil. No immediate relief to the urban populations can be anticipated on any large scale. Consignments of grain, dried milk and vitamin foods may be and indeed have been imported, especially to Belgium and to southern French territory. But the remainder of the winter in the west is going to be a period of endurance and even privation.

On the physical condition of the people little comment can yet be made, save so far as the chance impressions of a few transient medical officers or the health figures at the disposal of the authorities enable us to venture an estimate.

It must be recognised that in areas where the "black market" has been severely restrained without any corresponding methods of increasing average food consumption, numerous families will pass through a phase of painful scarcity. Thus in many urban areas, particularly no doubt in Belgium, Calorie levels are decidedly low. If this period does not last too long, no serious results may ensue. Children would appear to be thin and light rather than definitely stunted; and there are vague reports of numerous skin complaints of uncertain origin, due possibly in some cases to a complex vitamin deficiency. But it must be remembered that their fat and protein intake has been of a low order.

There is here no space to deal with the tangled tissues of the situation in the south-eastern countries of Europe. Beyond question there is much privation in Greece and Yugoslavia, though some food has been imported into parts of Greece and supplies of wheat have reached the eastern areas of Yugoslavia through the Russian armies.

Nutrition and National Health

THE issue in book form* of three Cantor Lectures delivered by Sir Robert McCarrison in 1936 will bring them before a larger circle of readers, for whom it should afford a valuable reference work on the fundamental importance of food in relation to health.

Divided into three parts, the first, "Food, Nutrition and Health," explains the processes involved in the function and the experimental method in research on nutrition, with examples in connexion with beri beri, "stone," and peptic ulcer. The second part deals with the relation of certain food essentials to structure and functions of the body, and discusses proteins, mineral salts, and more particularly vitamins. The last part is concerned with national health and nutrition, in which, among other matters, the author traces the effects of deficiency diseases in India.

In discussing physical inefficiency in Great Britain, Sir Robert quotes from the report of the Adjutant-General for the year 1934: "What was disconcerting to any citizen with a care for the good of his country was that over 54 per cent. of the men who went to the recruiting office did not come up to the physical standard laid down. In the big industrial areas of the north the percentage of rejections rose to sixty-eight." The opinion of a high military authority was that the chief cause of the men's rejection was malnutrition during childhood. "And if so high a percentage of men failed to come up to the by no means exacting physical standard laid down by the army authorities, how many of their womenkind were likely to be physically inefficient?" The author quotes further from reports on this serious matter, and recapitulates the chief faults of British diets, and further discusses the prevention of disease by diet. He sounds a hopeful note for the future. Much has been done on the lines suggested and the state of the nation's health after more than five years of war bears witness to the remarkable strides that the science of nutrition has made since the lectures were delivered. Much still remains to be done, and Sir Robert's constructive criticism points the way.

Meats and Fats

PAPERS on the "Effect of Storage and Microbial Action upon Vitamins of the B-Complex in Pork," "Quality in Meat and Meat Products," "Flavours in Food Fats," "Quick Method for Determination of Fat Content of Meat," and "Sodium Sulphate—Preservative or Deodorant?" were presented at the division of agricultural and food chemistry of the American Chemical Society meeting in New York City in September last.

E. E. Rice, J. F. Fried and W. R. Hess, Swift and Company, reported that the changes which occur in the vitamin B-complex content of pork during ordinary cooler storage are so slight that they fall within the experimental error of the analytical methods. Two storage experiments have been made, one with paired pork loins and the other with replicate samples of

* *Nutrition and National Health*. By Sir Robert McCarrison, C.I.E., M.D., D.Sc., LL.D., F.R.C.P. Pp. 75. 6s.

ground lean pork. In neither case was a significant change detected in the vitamin content of the meat during storage periods that did not involve extensive bacterial action.

However, by prolongation of the storage period until the meat approached incipient spoilage and then on into various stages of bacterial decomposition, more definite information was obtained. Bacteria counts and characterisations were made and correlated with changes in vitamin content.

In samples showing extensive bacterial growth, there were losses of thiamine, increases of riboflavin and pantothenic acid, but no change in niacin content. The increases seem to indicate synthesis of riboflavin and pantothenic acid during microbial growth. The losses of thiamine were slight except in samples stored for long periods of time at room temperature, and in such cases it was impossible to determine whether the decrease in thiamine was due to the bacteria or to slow thermal decomposition.

Quality in Meat

Pointing out that it is understandable that interest in the quality of meat should be general, continuous and intense, O. G. Hankins, of the Bureau of Animal Industry, U.S. Department of Agriculture, declared that quality includes many factors such as wholesomeness, appearance, composition, tenderness, flavour, juiciness and nutritive value, most of which must be further subdivided. Development of adequate methods for measuring characteristics of meat has been and, in certain respects, continues to be a difficult problem.

One of the most important chemical problems of the food fat industry concerns either the elimination or the preservation of flavours in certain fats, according to H. E. Robinson and H. C. Black, Swift and Company. The trend in the general shortening industry is for the complete elimination of all food fat flavours. While tremendous quantities of lard are still used as a shortening, the flavour of this product is not considered particularly desirable for many cooking purposes. The flavours of vegetable oils and other meat fats are eliminated by processes of refining and deodorisation of the processed fats and oils.

The retardation of flavour reversion is another important project in the chemistry of fats and oils. The delay of the oxidative flavour changes due to rancidity involves the use of certain antioxidant materials. Most prominent among food fat antioxidants at the present time are gum guaiac, nordihydroguaiaretic acid, tocopherols, citric acid, and lecithin.

Elmore A. Copeland, War Department, Memphis Army Service Forces Depot, V.C. Laboratory, proposed a quick method for determination of fat content of meat and meat products. The method would reduce the time of determination from 18 hours by A.O.A.C. method to one hour. The reduction in time would offer an important advantage in quality control of manufacturing processes.

The Massachusetts law permits use of sulphur dioxide and its compounds in foods, allowing up to 0.1 per cent. as anhydrous sodium sulphite in meats and meat products. A study was made by Carl S. Ferguson, Hermann C. Lythgoe and Olive F. Sheridan, Massachusetts Department of Public Health, to determine the effect of sodium sulphite upon the appearance, odour, ammonia development and bacterial growth in hamburger steak.

Of two samples of fresh beef muscle, the one treated with 0.1 per cent. of sodium sulphite immediately took on a bright red appearance of freshness, which persisted for several days beyond the point at which the chemical analysis indicated decomposition. No odour of decomposition products was apparent in the treated sample until the chemical analysis indicated advanced decomposition, beyond the tenth day. The untreated sample had developed an odour of decomposition on the seventh day, and was sticky, greatly discoloured, and had a strong odour of decomposition on the eighth day. Chemically, the treated sample was decomposed on the eighth day.

There was little difference in the total bacterial count under atmospheric conditions in the two samples up to the fourth day, after which the untreated sample showed a rapid daily increase, whereas the sample containing the sulphite showed a decrease. On the seventh day the treated sample had a count of 69,000 as compared with 7,000,000 in the untreated sample.

Advice to Bakers

THE Ministry of Food warned bakers in October that the condition under which home-grown wheat was harvested caused a tendency for flours to have an abnormally high maltose figure, and so rendered the bread more difficult to bake out.

The advice issued is now amplified as follows:

1. The water absorption of the flour should be carefully watched. For most flour from 14½ to 15 gallons per sack will be best, since doughs tend to slacken during fermentation and should, therefore, be made on the firm side.

2. The salt rate as for 85 per cent. extraction flour should be maintained, since salt is most useful in stabilising a dough.

3. All malt products and improvers containing malt or soya products should be omitted. Fat up to the permitted 2 lbs. per sack is a great help in the handling of present-day doughs, and should be used when available.

4. Doughs should be fully fermented. Green doughs or chilled doughs will produce bread with a damp, coarse crumb, which cannot be baked out. Two- to three-hour bulk fermentation systems are generally to be recommended.

5. Final proof may need to be controlled to prevent excessive volume with a resultant unstable crumb; in all cases a well aerated loaf should be aimed at, since such a loaf bakes out best.

6. Oven temperature and baking times, adjusted to avoid excessive crust colour, give a better baked crumb. Loaves should be spaced in the oven so that the heat can circulate freely between them; avoid close packing. Generally it will be found that an extra 10 minutes' baking is an advantage.

The services of the Ministry's advisers are available to all bakers, and practical help and a personal call from one can be obtained by writing to the Director for Bread, Bryn Euryn, Colwyn Bay, Denbighshire.

Food Analysis

Progress in 1944

D. W. GROVER, B.Sc.

CHEMISTS concerned with the recording of a large number of analytical results as applied to the quality control of manufactured products will be interested in two recent papers dealing with some statistical aspects of this problem.^{1,2} The method of sampling production has a distinct bearing upon the interpretation. A fundamental assumption of any statistical calculation is that, at some stage, a random selection of the production has been made. If, therefore, as is frequently the case, a representative, as distinct from a random, sample is drawn, the deviation in quality observed cannot be used directly for calculating the deviation in the whole production. For obtaining a truly random selection it is best to make use of tables of random numbers as published in standard works on statistics.

Purpose of Statistical Analysis

The deviation observed in the analytical figures of samples drawn from the production of a "uniform" article is made up of four components: (a) unavoidable variations in manufacture, (b) failure to maintain manufacturing standards, (c) unavoidable experimental error in analysis, and (d) failure to maintain normal analytical accuracy. The purpose of statistical analysis is firstly to be able to diagnose deviations due to causes (b) and (d), and secondly to provide evidence of success in any attempts to reduce deviations due to causes (a) and (c). In order that this may be possible it is necessary to know what are the mean and the standard deviation of analytical figures when the process and analysis are both functioning normally. The only way of arriving at the standard deviation is to carry on production at the best practical level of control and to observe, by careful routine analysis, the composition of as many samples as possible drawn at random.

When a tolerance in composition is applied to the product for some legal or other reason it is possible to calculate composition from the observed standard deviation. The connection is not a mathematically formal one, for whereas legal requirements may state that an article must *never* fall below a certain minimum quality, a statistical treatment only becomes possible when the word "never" is replaced by a probability—e.g., 1 in 1,000 or 1 in 10,000. When this probability has been decided upon, and the standard deviation is known, the requisite mean composition of the product can be calculated.

For instance, in the manufacture of baking powder the standard deviation of the available car-

bon dioxide, under normal working conditions, may be 0.25 per cent. In order that the statutory minimum of 8 per cent. shall be observed 9,999 times in 10,000 it would be necessary to maintain a mean four times the standard deviation in excess of the minimum. That is, the mean composition would be 8 per cent. $+ 0.25 \text{ per cent.} \times 4 = 9 \text{ per cent. available CO}_2$.*

Even when the mean and the standard deviation are known it is still not possible to state definitely, from the examination of a few samples, whether the desired degree of control is in fact being maintained. Recourse must again be made to practical as distinct from purely mathematical reasoning. Experience suggests that the probability of the analysis of a sample deviating from the mean by more than plus or minus three times the standard deviation is sufficiently remote to justify the conclusion that, when such a deviation is found, something has gone wrong, either with the process or the analysis.

The **identification of crystalline substances** by microscopic observation of the refractive index and other crystallographic data has been developed in detail by Keenan.³ Figures for many pharmaceutical products have been published and the method has found at least one application to the analysis of foods (see under Preservatives—the identification of monochloroacetic acid).

The operation of **counting particles** in the field of a microscope can be extremely tiring, especially if a large number of fields have to be observed. An attachment developed particularly for the recording of mould counts is claimed to reduce this fatigue to a considerable extent.⁴ The device consists of a camera cable-release attached to the moving stage. On pressing, a needle punctures a piece of paper fixed to a cork disc attached to the frame of the microscope. A record of the count can be prepared without removing the eye from the eyepiece.

MILK

A considerable advance in the analysis of **samples of milk which have soured** before examination is made in a paper by Macdonald.⁵ Two methods are proposed for arriving at the fat and solids-not-fat in the original milk. The first involves determination of the principal decomposition products. 10 g. of the sample are distilled from *n*-heptane in a Dean and Stark apparatus. Volatile acids and alcohol collect in the aqueous

* This assumes a normal distribution.

fraction of the distillate, fat dissolves in the *n*-heptane, while solids-not-fat remain undissolved. A technique is described for separating and weighing the two latter fractions. The volatile acids may be determined by titration and the alcohol by oxidation with potassium dichromate-nitric acid mixture, the reduction in yellow colour of the oxidising solution being measured in a Lovibond tintometer. Ammonia is determined by volatilisation into dilute acid at room temperature in a Conway Unit and treating the distillate with Nessler's solution. By applying corrections for these decomposition products good agreement between original and soured milk is obtained. A simpler technique, also giving good recovery, involves treatment of the sample with an excess of dilute ammonia and calculation of non-fatty-solids from the specific gravity corrected for ammonia used. Fat may be determined by either Gerber or Werner-Schmid methods.

The general reliability of the custom of referring to the cow in cases when a low freezing-point depression indicates added water receives confirmation from figures published for the daily **variation in freezing point** of milk from small herds and individual cows.⁶ The variation observed over a period of three days is of small significance in assessing the quality of the milk.

The **gas content of dried milk** is of importance in relation to its keeping quality. Two methods for its determination are described by Muers and Anderson.⁷ In one the sample is suspended in *n*-propyl alcohol and introduced into boiling water. The evolved gas is collected, transferred to a gas burette, measured, and, if necessary, analysed. The second method is based on density determination of the powder suspended in *n*-propyl alcohol. These methods agree well and indicate that figures reported by earlier workers were probably high.

A new method for determining **citric acid in milk** has the advantage of rapidity compared with the pentabromacetone methods, occupying only a few hours for completion.⁸ The citric acid is isolated as lead citrate, oxidised with an excess of perchlorate-cerate solution, and back titrated with sodium oxalate using nitro-ferroin as indicator. Slightly high but reproducible results are obtained.

Cow manure may be identified in milk products by means of the altered staining characteristics of fibrous material brought about by digestion in the cow's stomach.⁹ Cellular contents which have not been digested stain readily with Fast Green FCF, whereas material from manure remains brown. The test is unaffected by condensing and cheese-making processes.

Examination of **heat-treated milk** by the phosphatase and methylene blue tests is the subject of a recent order.¹⁰ The methods, which follow well-established lines, are given in detail, together with sampling procedure and instructions as to frequency of testing. A new indicator, 2,6-dibromo-

N-chloroquinonimine, is claimed to give a very sensitive reaction for phosphatase.¹¹ Deviations of 2° C. in flash pasteurisation and 1° C. in the holding process can be detected.

The **fat content** of cream and ice cream may be rapidly determined by chloroform extraction.¹² The procedure is particularly applicable to ice cream, which gives troublesome emulsions with the Rose-Gottlieb method. The sample is shaken with chloroform, the emulsion broken with anhydrous sodium carbonate, and the chloroform and washings filtered into a tared flask, which is reweighed after distillation and drying.

EGG PRODUCTS

The examination of **spray-dried egg** has been the subject of an increasing number of papers. Physical and chemical tests are now available for assessing the quality of this product with some accuracy. Hawthorne has reviewed methods of determining the solubility of the protein of dried egg.¹³ Probably the most convenient method is to determine the refractive index of a suspension of the sample in aqueous solution. Several variations of this test have been proposed, but that known as the Haenni test is probably the most used. 1 g. of the sample is suspended in 5 ml. of 5 per cent. sodium chloride solution under standard conditions and the refractive index of the suspension determined. The difference between this figure and the refractive index of the salt solution, multiplied by 1,000, is the Haenni number of the sample. Fryd and Hanson¹⁴ have investigated the connection between physical and chemical tests on dried egg and its flavour score. A formula involving the fluorescence and the Haenni value gives very good agreement with flavour scores based on the Low Temperature Research Station system of scoring. Actually a study of their figures indicates that in most cases fluorescence alone correlates very well with flavour. Another test for quality is based on the detection of hydrogen sulphide evolved when the sample is treated with dilute sulphuric acid.¹⁵

The chemical and bacteriological examination of **liquid, frozen and dried eggs** can be used as a basis for detection of decomposition.¹⁶ With liquid or frozen egg a count of over 5,000,000 organisms per gram with determinable amounts of formic, acetic or lactic acids in excess of 7 mg. per 100 g. indicates the presence of decomposed egg. With dried egg the corresponding figures are 100,000,000 per gram, 65 mg. of formic or acetic acids, and 50 ml. of lactic per 100 g., dry basis. These figures agree well with the taste of the eggs.

MEAT AND FISH PRODUCTS

Further methods for the **analysis of sausages** containing soya are proposed by Illing and

Whittle.¹⁷ The quantity of soya is based upon either the sucrose or the manganese contents. The authors consider a determination of sucrose by copper reduction before and after inversion to be the most reliable method of assessing the amount of soya in sausages. The average figure is 11.4 per cent. expressed as dextrose per cent. of dry oil-free soya. This figure is based upon five determinations, the extremes being 9.9 per cent. and 12.2 per cent. Soya may also be calculated from the manganese content of the sausages. Whichever basis is employed, an uncertainty of about 1.4 per cent. in the estimation of meat fat is introduced by the variation of fat in the soya grits from about 6 per cent. to over 20 per cent.

Rapid methods for **total fat and salt determinations** in meat have been published. The former¹⁸ consists of extracting the meat several times with ether in a separating funnel into which a sintered glass septum has been fused. The time required is from 1½ to 2 hours. For the salt determination 10 g. of the finely divided sample are transferred to a 200 ml. volumetric flask, mixed with 100 ml. hot water and held in a boiling-water bath for 15 minutes. After cooling, the suspension is clarified, made to volume and filtered. The chloride is then titrated with standard silver nitrate solution.¹⁹

Glycerol may be determined in meat broth, etc., by evaporating the sample to a syrupy consistency, solidifying with an excess of anhydrous sodium sulphate and extracting with acetone. The final estimation after removal of acetone is made with potassium permanganate.²⁰

Chemical and physical methods of assessing **spoilage of fish** continue to receive attention from food chemists. "In a perishable food such as fish or fish fillets, where spoilage occurs almost entirely through bacterial action at the surface, the measurement of end products of such bacterial action in the surface layer of the tissue promises the most satisfactory index of spoilage."²¹ Methods based upon determination of trimethylamine and tyrosine have been applied to this end. The production of trimethylamine during storage causes a steady rise in pH; and surface pH has been found to be a satisfactory and rapid indication of spoilage. The pH range of 6.5 to 7.0 is associated with "fresh" fish, the variation being due to degree of discrimination of the taster. A pH between 7.0 and 7.5 indicates that spoilage has definitely started. Above 7.5 the fish can be classified as spoiled. The pH is measured by placing a glass electrode in contact with the moist surface. Correlation of pH with the trimethylamine and tyrosine contents is satisfactory.

Another method of assessing spoilage, which is also applicable to other **protein foods**, depends upon an estimation of volatile reducing substances.²² Press juice of the fish is aerated at a controlled rate at room temperature and the volatile

reducing substances, which are presumably the cause of off-odours, are estimated by their action on alkaline permanganate at room temperature, a sharp rise in these occurring during the storage of fish at about the same stage as the deterioration of smell. Unfortunately there is no definite value which can be associated with spoilage in all samples of fish. Further work has been reported on the volatile acid method for estimating spoilage.²³

Methods for the determination of **moisture and crude fat** in fish have been published in the *Journal of the American Official Agricultural Chemists*.²⁴

FATS AND OILS

Estimation of the **squalene content** of an edible oil is useful in checking a claim that an edible oil contains appreciable amounts of olive oil.²⁵ Squalene is a highly unsaturated hydrocarbon and has been separated as a characteristic crystalline hexahydrochloride from olive oil and most other animal and vegetable fats, but not from cacao butter. Expressed as milligrams per 100 g. the squalene content of olive oil varies from 136 to 708 with an average of 330. Other edible vegetable oils have figures from 49 downwards. Squalene is separated from the unsaponifiable fraction by selective adsorption in a column of activated alumina, and its quantity is calculated from the halogen capacity of the unadsorbed residue.

The **fat from horse flesh** differs from that of beef, mutton and pork in that it contains a larger proportion of linolenic acid. The most frequently applied method for estimating this unsaturated fatty acid is by means of its relatively insoluble hexabromide. An improved technique for this test, which takes into consideration the solubility of the linolenic acid hexabromide and prevents the co-precipitation of other fatty acids, should add considerably to the accuracy of this determination.²⁶

A new colorimetric method of estimating **peroxides in fat**, particularly applicable to milk powders, involves the reaction between the fat and ferrous ammonium sulphate and ammonium thiocyanate, all in acetone solution. The red colour produced, measured in a spectrophotometer, provides a sensitive measure of the peroxides—apparently more accurate than that provided by the usual iodometric titration.²⁷

Zinc may be substituted for lead for the precipitation of **isooleic acid** from admixture with other unsaturated acids.²⁸ The values are not always identical, but the use of zinc is considered to have certain advantages. Analytical details are given in *Chemical Abstracts*.

Gallic acid is used as an **antioxidant** in certain food products. Two methods for its determination have been developed.²⁹ One depends upon the spectrographic measurement of absorption of light of 270 mμ when the ionisation of gallic acid is suppressed by the presence of a stronger acid.

The other is based on the colorimetric estimation of the complex formed with ferrous tartrate.

The **softening point of fats** is frequently of great technical importance and a reliable method for its measurement is likely to be of considerable value. Such a method is based upon the "ball and ring" technique originally developed for bituminous products.³⁰ The fat is cooled over mercury in a test-tube placed in ice and water, and is held in a refrigerator for at least 30 minutes. A ball bearing is placed over the fat and the tube is slowly heated in a water bath. The softening point is taken to be when the ball is exactly half submerged. The most important factor in obtaining reproducible measurements is to control the rate of cooling the fat. If this is either too slow or too rapid low values are obtained.

Two small analytical notes may be of interest. One concerns **Wijs' solution**. This common reagent has been found to be extremely stable provided the bottle in which it is stored is not opened frequently.³¹ For this reason the use of small bottles for storage is recommended. The other concerns an **improved indicator** for the determination of free fatty acids. The indicator, previously proposed in 1924 and again recommended, consists of 1 part of 0.1 per cent. aqueous solution of cresol red with 3 parts of a 0.1 per cent. aqueous solution of thymol blue, both indicators being neutralised with sodium hydroxide. The indicator changes from pink pH 8.2, through grey, to purple at pH 8.4.

SUGARS AND STARCH

The detailed analysis of **sugar mixtures**, such as chocolate and malt products, can be achieved by the help of selective ferments. A new scheme for this purpose, suitable when lactose, sucrose, maltose, levulose and dextrose may be present, has been published, together with the necessary charts and tables.³² Levulose is determined after oxidising other sugars with hypiodite. *Saccharomyces cerevisiae* ferments all but lactose, and *Torula cremoris* all but maltose.

The presence of buffer salts retards the inversion of sucrose by acid for the **Clerget double polarisation method** of estimation. This fact may lead to errors unless recognised and provided for. An example is the estimation of sucrose in molasses, when either a higher temperature or a longer time is required for complete inversion.³³

A system for the **identification** of various kinds of **starches**, originally proposed by Reichert, has been modified and applied to the examination of 30 starches.³⁵ The criteria used are polarisation, gelatinisation, temperature and reactions with iodine, gentian violet, etc.

A study of the effects of temperature on the apparent moisture content of potato starch using various kinds of oven and distillation methods sug-

gests that a suitable standard treatment is to dry to constant weight in a Brabender moisture tester at 135° to 140° C. This agrees well with the British standard method, with vacuum drying at 80°-100° C., and with results by distillation from xylene or tetrachlorethylene. Toluol gives slightly low results by the distillation method and the use of carbon tetrachloride leads to distinctly low recoveries of moisture. The Karl Fischer titration method gives rather low results compared with the basic method chosen.³⁶

The detailed study of methods for determining the **dry substance in starch conversion** products by Cleland and others is continued by the publication of refractive index/dry substance/Beaumé tables for these materials. The refractometer has the advantage of speed and simplicity.³⁷

Further experience with the **Hopkins method** for the estimation of starch in cereals (polarisation in calcium chloride solution) has confirmed its accuracy. Details of a slightly modified procedure have been published.³⁸

FRUIT AND VEGETABLE PRODUCTS

To determine the solid matter in concentrated **citrus juices** two reliable methods are available. One is to dry to constant weight at 40° C. in vacuum. The comparatively low temperature is necessary because decomposition readily occurs at, for instance, 70° C. A more expeditious procedure is based upon a determination of refractive index. Sugar tables, suitably corrected, enable this figure to be converted to solid matter per cent.³⁹

A comparison of rapid routine tests for the determination of **moisture in dehydrated vegetables**—accelerated hot air drying, electrical conductivity meter and variation in radio-frequency impedance (as in the Cambridge and N.P.L. Moisture Meters)—reveals that each test had advantages in particular circumstances. All of these methods can be used with success for control purposes.⁴⁰

A novel way of **determining pectin** has been described by Williams and Clarence. The pectin solution is first de-ashed, if necessary, by passing through cation-exchange and acid-adsorbing columns and the pectin is collected by electrophoresis on the anode of an electrolytic cell. The film is adherent and can be washed with alcohol and dried at 105° C. to give good agreement with the calcium pectate figures.

(To be continued)

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Preservatives in Food

1. The Public Health (Preservatives, etc., in Food) Regulations, 1925

AN ORDER in Council adding Regulation 60CAA to the Defence (General) Regulations, 1939, has been made (S.R. & O. 1944 No. 1311). Paragraphs (1) to (7) of the new Regulation relax the prohibitions contained in Regulations 4 and 11 of the Public Health (Preservatives, etc., in Food) Regulations, 1925, to allow:

- (1) the importation, under and in accordance with the terms of a licence granted by the Minister of Food, of oranges in wrappers treated with diphenyl, and their subsequent sale;
- (2) the importation or manufacture under licence issued by the Minister of Food, and subsequent sale of:
 - (i) meat which contains sulphur dioxide;
 - (ii) margarine which contains borax;
 - (iii) bacon which contains borax;
 - (iv) dehydrated vegetables which contain sulphur dioxide; and

- (v) jam which contains sulphur dioxide in excess of the proportion specified in Part I of the First Schedule of the Regulations.

The amendments made under paragraphs 2(i), (ii) and (iii) above had already been effected by Ministry of Food Statutory Rule and Order—*i.e.*, the Meat (Addition of Preservative) Order, 1941, No. 1395; the Margarine (Addition of Borax) Order, 1940, No. 982; and the Bacon (Addition of Borax) Order, 1940, Nos. 547 and 1833 and 1942, No. 1372. These have now been revoked.

With regard to the relaxation in respect of dehydrated vegetables, the sulphur dioxide content will be limited, the limits being specified either in the licence issued by the Minister of Food or in the authorisation to import. Further information regarding the limits to be prescribed will be circulated for the information of Food and Drugs Authorities.

In the case of jam, licences issued by the Minister of Food will authorise a sulphur dioxide content of not more than 100 parts per million.

2. The Public Health (Condensed Milk) Regulations, 1923

Paragraphs (8) and (9) of the new Regulation contain a relaxation of certain requirements of the Public Health (Condensed Milk) Regulations, 1923, already effected by the Condensed Milk (Milk Content) Order, 1940, No. 1896, which has now been revoked.

3. The Agricultural Produce (Grading and Marking) Act, 1928

Paragraphs (10) and (11) of the Regulation relax certain requirements of the Agricultural Produce Grading and Marking) Act, 1928. Paragraph (10) exempts from section three of the Act (which provides that it shall not be lawful to sell or expose for sale any preserved eggs unless they are marked in the prescribed manner):

- (a) any hen or duck eggs in shell which have been laid in the United Kingdom; and
- (b) any hen or duck eggs in shell which have been imported into the United Kingdom from the United States of America or from any of the Dominions, except eggs which have been marked with the word "cooking" in pursuance of any law of the Union of South Africa relating to the export of eggs.

Paragraph (11) of the new Regulation suspends section four of the Act which provides for the registration of premises used for the cold storage or chemical storage of eggs and for the marking of British eggs which have been kept in such premises.

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.

The Proof of the Pudding

THE DIFFICULTY, even the impossibility, of imaginative recapture of past pleasures is one of life's minor ironies. This was brought home to me while indulging in the luxury of the Sunday post-prandial siesta I tried to call to mind, as an antidote for the austerities of the meal, the sensations of red-letter repasts of pre-war days.

Curiously enough, it seems to be possible to achieve a measure of vicarious ecstasy by *reading* about gastronomic joys, and the opportunity of doing so is presented by a recently published anthology with a heartening title.*

Consisting of selections from six peace-time and four war-time issues of the *Food and Wine Quarterly*, its *raison d'être* is explained in a preface by one of the editors, Louis Golding, who says, "The continuance of the *Quarterly* during the war years was a keeping alight of a torch, as gracious a thing as the keeping alive of ballet and music and the other fine arts." Wherefore the reviewer must approach his subject with due reverence.

To choose from, fifty-one items of varied literary fare, garnished with subtly humorous drawings by Ziegler, are served.

*

Just before reading this book I had been marveling at the docile way we English people bear the bitter criticisms of our food and cooking, criticism emanating not only from foreigners but from our natives. Small hope had I of finding praise for the home article, but there it was—tucked away in an account by A. J. A. Symons of a walk from Great Yews, through Dorset, ending at Seaton. In the course of charming descriptions of the countryside he tells of wonderful meals haphazardly taken at wayside inns as well as less humble places. The first meal was rabbit swimming in an appetising half-stew, half-sauce, which the travellers "ate, and marvelled." The whole journey was a triumphal gastronomic progress, strewn with perfection in food and wine.

At one stopping-place the cellar is visited, and in a dark corner rested four different 1914 clarets and a remnant of long standing—half a dozen of sherry, with capsules stamped Mitchell and Toms, Chard. A bottle of Beychevelle 1914, a Durfort Vivens of the same date, and a bottle of sherry were salvaged and enjoyed.

It is a curious thing, this discovery of treasure of the alcoholic variety in unexpected places. Where men gather together, especially in the smoke rooms of liners, where travel stories most abound, there is almost sure to be one about a wonderful liquor, produced by an innocent (or otherwise) Mine Host

* *We shall Eat and Drink Again*. Edited by Louis Golding and André L. Simon. Pp. 275. London. 12s. 6d. net.

in the back of beyond, in most unlikely places. Can the phenomenon be ascribed to the absent-mindedness of travelling *bons viveurs* dropping good things on the trail?

*

Any feeling of complacency engendered by Mr. Symons' praise was soon dissipated. First, a description by E. M. Forster of a grim landing at Tilbury on a bleak October morning. Tilbury, of all places, especially if one's ship has recently been churning southern seas, does not exactly savour of Merrie England, and he would be an optimist who expected a Lucullan breakfast on the Tilbury-London train, unless things have changed in past years. From what Mr. Forster says, they haven't. He rages at the alternatives of porridge (lumpy) and prunes (grey). "When we eat upon an object that moves, such as a train or a boat, we expect, and generally get, absolute muck," he protests. I have eaten some tolerable meals in trains and aboard ship, but Mr. Forster's jeremiad calls to mind a painful train journey over a South American plain in mid-summer. On the morning after a restless night in a sleeper shared with three other travellers, I made my way to a table in the dining car in search of coffee and iced water. My *vis-à-vis* was a gentleman enjoying a beefsteak of almost unbelievable dimensions, with two greasy fried eggs astraddle. (*Huevos á caballo*). As Spanish custom dictates, he pointed to his plate and said "*¿Quiere?*" meaning "Have some?" to which I returned the conventional "*Gracias*," signifying "Thank you," and also "No." The latter heartfelt on my part. I could have done with some of those Tilbury prunes, grey or any other colour.

*

C. E. M. Joad contributes an article entitled "Some Women under whose Regime I have Lived and Fed." Once again are found vicious tilts at English food and cookery. The onions for steak-and-onions are "undercooked or frizzled tasteless and served dank." He has "never seen a first-class meal which has taken thought and involved skill in its preparation, emerge from a really clean kitchen. What that proves it is hard to guess, but I have often wondered why the particular architecture of many restaurants puts the kitchen next to the w.c.'s."

Joad ends with the dictum (and it is almost possible for a Brains Trust fan to hear his perky voice), "Englishwomen, in fact, have no culinary taste."

It would not be wise too seriously to take all these lamentations about our food. The Englishman tends to grumble about most things, but is surprised if his complaints are taken at their face value.

Institute of Refrigeration

We are not the only ones who foul their own (culinary) nests. Crosby Gaige disserts on flavour and philosophises on science. He also abuses the cuisine of his own country, thus: "Although this America of ours is prodigally rich in natural food resources, its average cuisine is without a doubt the least inspired in the world." However, most of his article is devoted to wise communings on spices and herbs. "Pepper is not just pepper to me. It means Lampong or Tellicherry, Malabar or a dozen others. They all differ subtly from each other."

I wonder whether a Frenchman ever dares to criticise his food or cooking. One swallow does not make a summer, but there is one French dish which it surprises me could possibly be enjoyed by a nation of *gourmets*. It is called *Museau de Bœuf*. It is made from the noses and lips of cattle and eaten with vinegar and salad. It is of a consistency the most glutinous imaginable.

Maurice Healy quaintly boasts of being able to boil an egg. He is, of course, pulling our legs, his discovery being that a small egg takes three minutes to boil while a large one takes three-and-a-half. Now I can say my piece (this writing about food is infectious!). I ate those three-and-a-half-minute eggs for years. The albumen thick and leathery next the shell and little better next the yolk; the flavour sulphurous. I take leave to tell how to cook a "boiled" egg whose white is creamy yet with a sufficient firmness, which blends in the mouth with the yolk, whose flavour is a revelation. A pint of water is brought to boiling point and removed from the fire. The egg is placed in the water and left there for seven minutes. The exact conditions must be ascertained by a little trial (and probably error), the time being varied according to atmospheric temperature and the composition of the utensil, which govern the rate of cooling. This is worth the trouble or will be when eggs come in again.

*

All this only skims the surface of the book. André L. Simon contributes a history of gastronomy in miniature and quotes from the literature from *The Book of Apicius* to Mrs. Beeton. In discussing the scientist's attitude to nutrition, he inclines to the idea of a short life and a gay one—gay in the gastronomic sense. Scientifically balanced food can be as attractive as any, and adherence to it gives the eater that feeling of euphoria which makes for joyful living.

Of the writings on good wine, asparagus (how to grow it as well as cook it), food in many countries, and a host of other sidelights on the main subject, there is generous measure. Most of them, each in its own way, join in the apotheosis of good living, in graceful prose and piquant versification. The editors of the anthology may be congratulated on the excellence of their selection.

T. CROSBIE-WALSH.

SPEAKING at the anniversary luncheon of the Institute of Refrigeration, the Minister of Food (Lt.-Col. J. J. Llewellyn) said it was a great privilege to address those who had contributed to the great advances in the science of refrigeration. When the Ministry bought food overseas (and they had recently purchased all the exportable surplus of meat and butter from Australia and New Zealand) it happened on occasions there was no ship ready. The produce consequently had to go into cold store, and when the ship came along it had to be a refrigerator ship. Unfortunately, however, those who built refrigerator ships had built them too well, because the Admiralty, with its intelligence and predatory instincts, came along and took a large part of the refrigerated tonnage for carrying, not dead meat, but live men who fought on every front. The ships left for food imports had also suffered from the U-boats. In this connection he wished to pay tribute to the Navy for that best conceived of all raids on the U-boats which had made such an effect on the amount of foodstuffs imported. He also paid tribute to the Merchant Navy for the way they had brought the food month by month, week by week, to these shores.

When they had suffered those losses in refrigerator ships the Ministry had to see with what imports they could dispense; also mutton and lamb carcasses were telescoped, beef bones were pressed into slabs, while they got those who were knowledgeable in the art of refrigeration to improvise new methods. Banana boats were adapted for transporting bacon from Canada. In the last war much bacon, preserved with borax, went bad; in this war, with refrigeration, we had been able to save our bacon.

Large stocks of perishable foods were necessary in wartime. He had had to make the greatest possible use of existing cold stores, and they had to build additional accommodation. The Ministry was most grateful to those in the cold storage business for the way in which they had operated their own cold stores and those of the Government. Their thanks were also due to the Institute because two of its members had occupied the important position of Director of Cold Storage in the Ministry of Food. Both Mr. Farrow and Mr. Howells had most ably carried out their work.

Ladies of the Realm

A COOKERY book* in an original form has been compiled by the Countess of Effingham, the profits from the sale of which will be devoted to comforts and medical supplies for the children of Soviet Russia.

The contributors are representative Englishwomen taking a leading part in war-time activities. Each of them is allocated a left-hand and right-hand page. On the left is a photograph, a biographical sketch, and an account of war-time work. On the right is the recipe, "procedure for making," remarks and facsimile of signature.

A gracious souvenir of these times.

* *Fare-Ye-Well with Ladies of the Realm*. Compiled by the Countess of Effingham. Pp. 94. 10s. 6d. net.

Trade News

Homogenisers and Impulsors

The Brush Electrical Engineering Co., Ltd., and the Improved Emulsification Process Co., Ltd., inform us that they have ceased to manufacture homogenisers and impulsors, and that their business in these machines has now been acquired by Messrs. G. and J. Weir, Ltd., Holm Foundry, Cathcart, Glasgow.

Future enquiries as regards renewal or supply of parts for, or the servicing of, these machines should therefore be addressed to Messrs. G. and J. Weir, Ltd., at that address.

* * *

Mr. T. A. H. Sycamore

Mr. T. A. H. Sycamore has succeeded Mr. A. Stevens, who has retired, as Secretary of the Food Manufacturers' Federation, Incorporated, and of the various organisations associated with the Federation, including the British Food Manufacturers' Research Association; the British Association of Research for the Cocoa, Chocolate, Sugar Confectionery and Jam Trades; the Self-Raising Flour Association; the Sausage Manufacturers' Association; and others.

Mr. Sycamore is also Assistant Secretary of the Manufacturing Confectioners' Alliance, Incorporated.

* * *

Polak and Schwarz (England) Ltd.

Mr. K. Bohemen, of Messrs. Polak and Schwarz (England), Ltd., who is now serving with the Netherlands Forces overseas, sends greetings and good wishes to all his friends in the trade.

Mr. J. Ph. C. Wessing, of the same firm, who has worked for the last few years for the Kenya Government, has now been released and is resuming his full-time duties. Mr. Wessing is special travelling sales representative for British India, Union of South Africa, British Africa, Rhodesia, Portuguese East Africa, Burma, Thailand, Straits Settlements, and Hong-Kong.

Soups and Coffee

Dehydration, Viteem soups, and a coffee preparation known as Delicaf, made by an entirely new process and in a new form, are the specialities of Atomised Food Products, Ltd. Viteem soups are ready cooked and contain a very high percentage of nutriment. They are obtainable in several popular varieties, which include tomato, green pea, and oxtail. All of them possess additional nutriment in the form of milk extract. Delicaf coffee contains no adulterants whatsoever and is ready for immediate use.

* * *

The Bacon Industry

In an address on "Pigs in the Long-Range Policy" at a recent meeting of the Farmers' Club, Mr. H. R. Davidson said that if the large-scale production of Wiltshire bacon was to be revived careful thought would have to be given to the concentration of curing accommodation in the Midlands and south-west centres. The lack of confidence felt by producers whose pigs had to be sent long distances to slaughter-houses, where they could not inspect the carcasses and personally discuss complaints, could be almost entirely dissipated if, as in Denmark, there were small factories distributed throughout the country so that all producers were within reasonable visiting and delivery distance.

* * *

Mr. W. L. Miller

It is with regret that we record the sudden death of Mr. W. L. Miller, chairman of the board of W. L. Miller and Sons, Ltd., food manufacturers, of Poole. He passed peacefully away at his home at Parkstone on December 1, 1944, aged seventy-four years.

Mr. W. L. Miller was a founder-member of the company, and he continued his active interest as chairman of the board until within a few days of his death.

Tribute to British Farmers

A group of British farming experts who have just returned from an extensive tour in Canada and the United States told a meeting of Press representatives at the Ministry of Agriculture recently that they had found great admiration for the effort made by British agriculturists during the war.

Mr. Anthony Hurd, Assistant Agricultural Adviser to the Ministry of Agriculture, who led the party, said that there was great praise for the toughness of the British people. The Americans understood much more than he expected the kind of problems which British farmers had to face in the sixth year of war. They praised and understood the thoroughness of our food production campaign.

* * *

Cake Quality

In a letter to *The Times* Mr. L. G. Harris, Secretary of the Incorporated Association of Purveyors of Light Refreshments, says: "Caterers—and I write on behalf of a great many of them—know what is said and thought of the cakes they have to provide in order to keep within the war-time law. They are far from satisfied with their products, and could, within the range of the ingredients they now receive, make better cakes and, in the case of restaurants, better sweets. The law, however, in the shape of the Ministry of Food, forbids the caterer to do what he likes with his own material. It prescribed an austerity cake in the days when austerity was necessary; now it refuses to relax in any way its rules, even though no extra rations are asked for in order to improve the standard of cakes and flour confectionery."

* * *

Society of Chemical Industry

The syllabus for 1944-45 published in *FOOD MANUFACTURE*, December, page 449, was that of the *London Section* of the Society only.

Food Manufacture

Automatic Temperature Control

For the majority of process work or for heating installations, including cooling, simple self-operating types of temperature controllers will give most satisfactory results. The need for larger sizes of such controllers has been filled by Messrs. Sarco Thermostats, Ltd., of Cheltenham, by their high-capacity types of regulators, being made in sizes up to 8 inches, and by their Sarco thermostatic hot- and cold-water blenders, recently made in sizes up to 6 inches diameter.

There are many instances where large volumes of steam or hot-water flow have to be controlled and where a smooth, gradual opening or closing of valves is required in order to keep a system at the correct temperature. The nature of the process and working conditions in general determine the use of either on and off controls or of "gradual" or modulating controls.

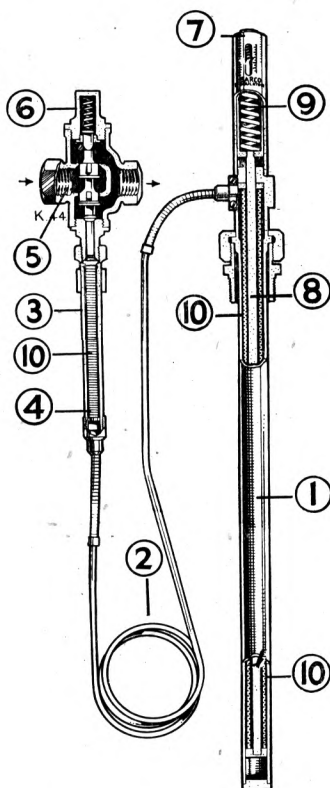
Continuous processes—for example, a condenser of a still—definitely require gradual control (*i.e.*, a regulating valve or a damper alter their position gradually in correlation to the heat demand, thus regulating the flow of the heating medium to the process). Batch processes or instantaneous hot water or oil heaters, for example, are better served with on and off controls. Both these types are manufactured by Messrs. Sarco Thermostats, Ltd., but where very large volumes of steam or fluid must be controlled gradually operating devices are definitely recommended.

Good results from automatic temperature control are generally obtainable where manual control—*i.e.*, constant application of hand control of valves or dampers—has proved applicable, but where constant application of hand control is not practicable. This applies certainly to large-sized valves, and it is understandable that no operator could stand the strain of operating, say, a 6-inch diameter valve (or perhaps a couple of 6-inch valves for mixing two streams of liquid) for hours on end, his eyes on a thermometer in order to counteract quickly any temperature or pressure change in the supply of heating or cooling medium. It is understandable

that correctly chosen automatic control devices, temperature regulators, or thermostatic blenders, will surpass accuracy of the operator's hand in the long run.

The working principle of the Sarco temperature regulator is shown in the illustration, which is a sectional view of this simple self-operating and self-contained control device.

The regulator is composed of a regulating valve with valve-closing element, a temperature-sensitive thermostat bulb, and a flexible tubing connecting bulb and closing element. If heat is



applied to the thermostat (1), the temperature-sensitive oil filling expands, and this expansion is transmitted through flexible tubing (2) to the valve-closing element (3) and plunger (4). Frictionless packless glands (10) consisting of bellows tubing make stuffing boxes unnecessary.

The regulating valve (5) is double seated and pressure balanced, but single-seated dead closing valves can be supplied. A temperature setting device (7) is used for adjustment of temperature, and a safety spring (9) re-

lieves excess pressure from overheating. Gentle and gradual valve opening allows only the right amount of heating or cooling medium to pass, and the gradual closing is provided by a spring (6), which reverses movement of the valve when the oil filling contracts. It should be noted that the Sarco principle of employing liquid expansion affords the same ample hydraulic power for positive valve operation at any set temperature, either low or high.

* * *

To Save the Hebrides

The claim that the newer methods of packing food, quick freezing, canning, and curing could be devoted to saving the lives and industries of the inhabitants on the west coast of Scotland and in the Hebrides was advanced by Dr. Fraser Darling, speaking at the Scottish Fisheries Exhibition in Edinburgh.

There were plenty of young men in the Hebrides who were prepared to take up fishing as a part of their livelihood, just as in the western coast ports, but they had not the money to finance the purchase of the 40- to 50-foot diesel boats, which would be the craft of the future. The State could make a good investment by creating a development fund from which interest-free loans could be drawn for providing a fleet of up-to-date small craft for use on the west coast, using seine nets rather than lines. The fund would also help to establish the shore installations, where the newer methods of processing could be adopted. These methods were the means of overcoming the handicap and disadvantages of distance.

At present the remote distances prevent the line fishermen from getting their catch into the markets with sufficient speed. They have been unable to compete with trawler fishing from ports outside the Highland area and have had to concentrate on the salted and dried fish markets. Now that foreign markets have been lost and the cheap and plentiful supply of freshly caught fish has altered public taste, the line fishermen have almost all lost their stakes. Boats and gear have been worn out and not replaced.

Brine Alkalinity

Although too high alkalinity may cause an undesirable precipitate to form in some brines, and a pH higher than 8.5 is not suggested without individual trial, all brines are less corrosive when their pH is well on the alkaline side (pH 8.5 to 9.5). This opinion was expressed before a recent meeting of the American Society of Refrigerating Engineers by Marc Darrin (Mutual Chemical Company of America), who added:

"Zinc is not harmed by alkalinites below pH 10.0, and its corrosive resistance, as well as that of iron, increases up to this pH. Above pH 10.0 there is danger of rapid solution of zinc in sodium brine. The customary harmful effect of aeration does not exist when chromates are present."

* * *

Water Softening

One of the difficulties with the ordinary continuous-flow lime and soda ash softening plant is the slowness of precipitation of the calcium carbonate, and particularly of magnesium (as hydrate), a most objectionable constituent. Thus lime and soda ash plants should give at least three hours' settling, and in practice four to five hours is sometimes required. The slowness of precipitation throws much extra work on the filters, which have to be cleaned at frequent intervals, resulting in waste of time and increase in net operating cost. Further, also, in many cases, in order to give a treated water of maximum softness, it is necessary to use an appreciable excess of reagent, largely due to the slowness in completing the chemical reactions.

In general, two methods can be adopted to overcome these difficulties. The first is the use of alum, added to the water after mixing with the reagent, which results in coagulation and a much more rapid separation of the magnesium precipitate, which in its initial stages is in the colloidal condition, which increases the difficulty. The second method is "seeding." A solution of some substance in water may be in the supersaturated condition, and separation of crystals from such a

solution can be helped by mechanical agitation, and especially the addition of a crystal of the substance, which is known as a "seed crystal," since it rapidly causes normal separation of crystals.

Calcium carbonate and magnesium hydrate sludge already formed in a softening plant have this "seed" effect upon the water under treatment, causing much more rapid gravity separation of the sludge and reducing the work therefore thrown upon the filters. Ordinary softening plants are so operated as to maintain a bed of sludge at the bottom to give this effect, which, however, is only limited because of lack of effective contact. Interest attaches to a new lime and soda ash softening plant, known as the "Accelerator," that has been placed on the market by the Paterson Engineering Co., Ltd., the basic principle of which consists in coagulant action and mixing very thoroughly by mechanical means, using a motor-driven agitator, the already precipitated sludge with the softening reaction, which results in a greatly increased "seed" effect.

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The E.D.A. 25th Birthday

The British Electrical Development Association, a national organisation formed to encourage the greater use of electricity, is now twenty-five years old.

During the lifetime of the Association great development has taken place in the use of electricity in the country, the number of consumers increasing from 700,000 in 1919 to about 11,000,000 at this time.

The Association has by advertisements, pamphlets, and exhibitions fostered the use of electricity in the home. When war broke out about 2,000,000 electric cookers were in use, and that total was being increased at the rate of 250,000 a year. At the outbreak of war electric refrigerators were becoming increasingly popular with the housewives.

The Association has just prepared a booklet and plans for model electric kitchens to suit small houses and flats. A feature of these kitchens is the large electric refrigerator and cupboards for food storage.

Mr. A. Ll. Matthison

Mr. A. Ll. Matthison, managing director of Arthur Holden and Sons, Ltd., Birmingham, celebrates this month the fiftieth anniversary of the date of his joining the company.

He gave up the prospects of fame and fortune in the Post Office service to join the business of the late Mr. Arthur Holden in November, 1894. Appointed director in 1907, he began that close association on the board with the late Mr. B. C. Holden and Mr. P. M. Sturge, during which the company made considerable headway. Mr. Matthison, now the sole survivor of these three gentlemen, still takes an active part in the management of the business.

He is a former President of the National Paint Federation, was Chairman for several years of the Midland Varnish and Paint Manufacturers' Association, and is also a Past President of the Birmingham Rotary Club.

He has written several books—technical works on tin-printing, biographies, essays, and, more recently, a play entitled "Brave New World."

At a pleasant little function held recently in the canteen at the Works in Bordesley Green Road a presentation was made to Mr. Matthison from the shareholders, directors, and employees of the company. It took the form of an illuminated address, a reproduction of the first folio of Shakespeare, and two water-colours by Copley Fielding. A pair of Georgian silver candlesticks were also presented to Mrs. Matthison.

To commemorate the occasion, awards were made to more than forty long-service employees with an average service of just under thirty years.

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Fish Cultivation Experiment

A second successful fish cultivation experiment on Loch Sween was described recently by Dr. F. Gross, lecturing in the Scottish Fisheries Exhibition, Edinburgh.

Dr. Gross mentioned the first experiment conducted during 1942 by members of the Department of Zoology, University of Edinburgh, and Milport Marine Station on Loch Craiglin, a small arm of Loch Sween.

As a result of fertilising, the population of small lake-bottom animals increased by some 250 per cent. Flounders and plaice feeding on these animals reached a size normally attained after five to six years.

Speaking of last year's experiment on Kyle Scotnish, another arm of Loch Sween, Dr. Gross explained that the water covering an area of about 150 acres was left undammed. The main problem was whether the monthly distribution of $2\frac{1}{2}$ tons of fertiliser would remain mainly in the "cultivated loch" or would be dissipated outside.

Results so far had been very encouraging and had shown that in spite of the tidal water the plankton—floating microscopic plant organisms—was maintained at a much higher density than in another arm of the loch running parallel to Kyle Scotnish, and a striking improvement in the growth of plaice and flounders was indicated.

* * *

Frost Zone Psychrometry

Discussing psychrometry in the frost zone at a recent meeting of the American Society of Refrigerating Engineers, D. D. Wile (Carrier Corporation) urged that precautions be taken to avoid large errors as a result of radiation from the observer's body to the wet and dry bulb thermometers. Heat from the observer's body and his exhalations of breath may alter the temperature and relative humidity in the vicinity where the readings are being taken, Mr. Wile pointed out. Reliable results can usually be obtained if the observer walks up and down the cooler aisle while manipulating a sling psychrometer and then takes quick readings with the aid of a small flashlight.

In temperatures far below freezing, Mr. Wile recommended that the wick be discarded and the bulb of the thermometer coated with ice. If necessary, freezing can be initiated by touching the bulb to a piece of ice or frost. At temperatures only slightly below freezing, where difficulty may be experienced in obtaining an ice coating, the wick should be wetted with super-cooled water and calculations made accordingly.

OBITER DICTA

- Heat-treated milk is an inferior breed of pasteurised milk, to put it vulgarly.—*Dr. Harry J. Rae, Aberdeen's Medical Officer of Health.*
- "Tonic Beverages" with practically no tonic properties have been sold to wartime shoppers.—*Mr. George H. Walker, Public Analyst for Salford.*
- While the British farm worker brings his mid-day meal with him and eats it cold, the Italians insist on a hot meal.—*A farmer of Stiffkey, Norfolk.*
- The Government has wisely decided to pledge the country to the policy of full employment and social security for all.—*The Financial News.*
- Although the prices of all sorts of fish have been fixed by regulation for the past four years, 99 out of every 100 customers don't know it.—*Eastern Evening News.*
- Let the dehydrationists realise in the post-war period that evaporation is not welcomed by the men who have had to live on it for years and know its failings.—*Sapper E. Hueme in a letter to Frank Illingworth.*
- The present system of fish transportation is antiquated. Most of the railway rolling stock used is unfitted for the purpose, and is unhygienic.—*Mr. Norman Dexter, President of the Birmingham Fish Merchants' Association.*
- The future of agriculture depends more than anything else on the ability of our farmers to produce food at prices which will bear a reasonable comparison to the prices at which we can buy food from overseas.—*Mr. R. S. Hudson, Minister of Agriculture.*
- Let the areas that like fat bacon get fat bacon, and the areas that like lean bacon see a bit of it, at least once in a while. The Food Ministry must not be like other Departments and say a difficult thing is impossible.—*The Press and Journal, Aberdeen.*
- Does every American have to submit to your secret weapon, undoubtedly devised to destroy the hearts and souls of Americans—that which you falsely and libellously call coffee?—*Mr. Maury Maverick, Chairman and General Manager, Smaller War Plants Corporation, in a letter to "The Economist."*

Another point brought out by Mr. Wile was that at low temperatures the amount of moisture in the air is greatly reduced and wet bulb depressions are correspondingly small. Thus, thermometers graduated in degrees or half-degrees are inadequate in the frost zone. For the accuracy generally required in engineering practice the wet bulb and dry bulb thermometers should be graduated to 0.2 degrees for temperatures near 20° F. and to 0.1 degrees or finer for temperatures near zero.

* * *

Seizing of Nuts, etc., on Turbines

A familiar trouble in industry is the "seizing" or "binding" of nuts and bolts and also studs, especially when subjected to a considerable temperature, as in connection with superheated steam, so that after tightening up they can only be unscrewed again with great difficulty, and in bad cases have to be cut off.

One of the causes may be the presence of solid impurities, such as grit, often from the oil or grease used, which cause a permanent deformation of the thread and tend to give a locking action. Another cause is chemical decomposition of the oil or grease, especially at higher temperatures, with formation of acid compounds which cause corrosion. Similarly, contact with steam or water gives rusting, a common cause of the seizing of nuts and bolts. Again, the oil or grease used often forms, at higher temperatures, a solid resin-like residue which acts to some extent as a cement and aggravates seizing. These considerations also apply to pipe joints, threaded covers, and other examples of the use of screw threads.

An effective remedy, however, for preventing seizing and binding is to use a dispersion of colloidal graphite in a suitable liquid, painted on the clean screw thread with a brush, sprayed, or applied in any other suitable manner, and allowed to dry before use. For this purpose colloidal graphite suspended in water, known as "Aquadag," can be used, a production of E. G. Acheson, Ltd. A later development is to use a dispersion of the colloidal graphite

in a highly volatile organic liquid, such as acetone, which enables nuts and bolts and other parts to be treated in batches, with very rapid drying. The result is the formation on the screw threads of a fine film of dry colloidal graphite which prevents seizing or binding in striking fashion, even after very long periods at considerable temperature.

* * *

Herring for Europe

The first consignment of 3,270 tons of Scottish herring is off to the Continent to help to feed the liberated countries; and this is one occasion when publicity campaigns will not be necessary to popularise this tasty fish. People who have known nothing but hunger since the Germans marched in will welcome our herring with the greatest zest. To many of them it will be the best food they have tasted for many a day, and in these circumstances our product is getting a first-class boost. The possibility of securing new customers in Europe in the post-war years is obvious if the people are to be supplied with herring in the months ahead.

* * *

Society of Chemical Industry. Food Group

The following meetings of the Food Group of the Society of Chemical Industry will take place:

February 5: Joint meeting with the London Section. Dr. F. Bergel will lecture on "The Use of Sugars and Amino-Acids for the Preparation of Important Nutrients."

February 14: Nutrition Panel domestic meeting. Dr. J. R. Nicholls and Mr. A. L. Bacharach will deal with "Food Management and the Chemist."

March 14: Microbiological Panel meeting. (1) Miss E. M. L. Elliot on "Certain Bacteriological Aspects of the Laboratory Examination of Meat," and (2) Mr. L. B. A. Grace on "Aspects of Practical Meat Inspection."

The annual general meeting of the Group will be held in April.

The above meetings will all be held in London.

British Association of Chemists

The following future meetings of the London Section of the British Association of Chemists have been arranged:

February 21, 1945: Joint meeting with the London and South-Eastern Counties Section of the Royal Institute of Chemistry and the Association of Scientific Workers to discuss "Chemical Education."

April 11: Mr. W. C. Peck, M.Sc., M.I.Chem.E., F.R.I.C., will lecture on "Solvent Extraction of Solids."

May 9: Annual meeting of Section.

All the above meetings are on Wednesdays at 6.30 p.m. and will be held, if possible, in the Chemical Society's Room.

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Food Education Society

The following meetings have been arranged for 1945:

February: Food Education Society luncheon. (Date to be announced in Press.)

March: "Food and Agriculture." Lecture by Lord Portsmouth. (Date to be arranged.)

April 16: "Food: The Science, the Logic, and the Art." Lecture by A. L. Bacharach, Esq., M.A., F.R.I.C.

May 3: "Food and Physique." Lecture by Sir Adolphe Abrahams.

June: Annual meeting and presidential address by the Right Hon. Lord Horder, G.C.V.O., M.D.

This programme is subject to alterations.

The Society has suffered the loss of its Hon. Treasurer, Mr. A. W. Johnson, who died recently. His untiring effort and generous support of the Society will be greatly missed. Mr. Harold Hunt, Hon. Librarian, has kindly undertaken to carry on the office of Treasurer for the time being.

The following new appointments have been made: Hon. Medical Secretary, Mrs. E. C. Pillman Williams, M.B.E., M.A., M.D.; Hon. General Secretary and Secretary to the Scientific Council, Eric Murdock, Esq., M.A., B.Sc., Ph.D.; Hon. Lecturer, W. B. Frank, Esq., B.Sc., L.R.C.P., M.R.C.S. Mrs. Fox continues her work as Hon. Organising Secretary.

Lectures on Nutrition

Professor S. W. Cowell, M.B., F.R.C.P., M.R.C.S., Professor of Dietetics in the University of London, is giving a course of ten lectures on "Nutrition and its Applications to Large-Scale Catering" on Fridays at 3 p.m. at the Royal Society of Arts Library, John Street, Adelphi, W.C.2.

These lectures started on January 19, and, while being intended primarily for members of the National Society of Caterers to Industry and for canteen workers employed by them, the Society would be glad to accommodate as many non-members as the capacity of the lecture-room permits.

At the end of the course it is proposed to set a test and possibly issue a certificate to those who reach a satisfactory standard.

The fee for the course of ten lectures is £2 2s., and requests for tickets should be sent to the Secretary, the National Society of Caterers to Industry,

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Brown Trout and Oysters

The potentialities of brown trout fishing in the Highlands and a revival of the once-flourishing oyster industry were emphasised by Captain R. E. Sawyer, Divisional Food Officer for Inverness-shire, when he addressed Inverness Scientific Society and Field Club.

Of brown trout fishing he said it was a subject of even greater importance to the Highlands than deer. The demand for fishing is increasing and will continue to increase after the war. If this fishing can be improved and made more accessible to the public, as has been done in other parts of the world, it would do more for the Highlands than any other single factor.

Regarding oysters, Captain Sawyer said the great difficulty now was to secure local co-operation for their collection. He would like to see this enterprise run on communal lines under local authorities, as was done in other parts of the world.

Captain Sawyer was afraid that the Scottish Office, as representing the Crown (the owners of oysters), had let this once-flourishing industry "go slide." Talk about rehabilitation! This industry should never have been allowed to go down.

Company Meetings

Gascoignes (Reading) Ltd.

The eighth ordinary general meeting of Gascoignes (Reading), Ltd., the milking machine specialists and dairy engineers, was held on January 9 at Reading.

Mr. George H. Gascoigne, M.I.Struct.E., chairman and managing director, in the course of his speech, said: "During the year which has passed your company and its associated company have been fully employed dealing with the increasing demands of agriculture and the various Ministries. In spite of continued labour and supply difficulties, the turnover for the year under review has again been a record, and the forecasts which were made at the last annual general meeting have been justified.

"The net profit for the year to October 31, 1944, is £20,349, after providing for all expenses other than directors' fees. In arriving at the net profit, full provision for depreciation has been made. This profit of £20,349 compares with £24,793 for the preceding year and £20,177 for the year to October 31, 1942. The net profit ratio to turnover shows a decline, entirely due to increased costs of production, particularly the increase in the wages charge. After deduction of directors' fees, the profit for the year is £19,791, against £24,343. The profit of £19,791 represents over 26½ per cent. on the issued share capital.

"After making the appropriations detailed in the directors' report and accounts, we are left with a net surplus on the year of £8,791, against £7,843. This surplus represents a net yield of 11·7 per cent. The directors recommend that a dividend be paid for the year at the rate of 15 per cent. actual, less income tax.

"During the past year we have marketed further new lines, and, in particular, our horticultural department now shows a satisfactory expansion. With regard to our milking plants and dairy equipment, we have for some time past been in close consultation with the authorities, particularly having in view the demands for clean milk, and I am certain

St. Martin Preserving Company, Ltd.

The following report of the directors was presented at the sixteenth annual general meeting of the Company on December 29, 1944:

"The directors submit herewith the balance-sheet of the Company as at March 31, 1944, together with the profit and loss account for the year ended on that date.

"A combined statement of the assets and liabilities of the parent company and its subsidiaries, based in each case on audited accounts made up to March 31, 1944, is included in order that shareholders may be fully informed."

A copy of the speech submitted by the Chairman was circulated.

After providing for the estimated excess profits tax liability of all companies and for the income tax liability of subsidiary companies on profits earned to March 31, 1944, the aggregate net profit for the year of the Company and its subsidiaries (all of whom made profits) amounted to £23,784 18s. 9d., which sum, together with the amount brought forward from the previous balance-sheet of £32,714 10s., less dividend paid on March 15, 1944—£6,714 12s. 10d. (total, £25,999 17s. 2d.)—gives an available balance of £49,784 15s. 11d., from which has been appropriated to writing off Branston suspense account £10,000. Provision for income tax on profits earned to March 31, 1944, was £6,515 10s. (total, £16,515 10s.), leaving an amount of £33,269 5s. 11d., out of which the directors recommend that there be paid a dividend at the rate of 6¼ per cent. per annum, less income tax (£6,718 15s.), and that there be carried forward the balance of £26,550 10s. 11d.

The policy of marketing entirely under the Company's own brand and of the development of the popular speciality line, Chunky marmalade, has been successfully continued.

we will continue to meet the needs of the dairy farmer."

The report was adopted.

Oxo Limited

At the annual general meeting of Oxo, Ltd., Mr. Kenneth M. Carlisle, who presided, said: "Our manufacturing resources have been taxed to their utmost throughout the past year in the endeavour to produce maximum supplies of Lemco, Oxo, and Oxo cubes. In spite of our best efforts, we have not been able to satisfy all requirements; but we have taken great pains to share out supplies as fairly as possible among our many customers.

"I need hardly remind you that our unseasoned extract of beef (Lemco) has been on the market for nearly eighty years and Oxo for over forty years.

"Scientific authorities have always recognised that beef extract is a valuable stimulator of the gastric secretions, thus facilitating digestion and promoting the assimilation of other foods, but they have been generally reluctant to ascribe to it any other food value.

"It is therefore with great satisfaction that I am able to inform you of the recent discovery that beef extract is one of the richest sources of the important vitamin nicotinic acid, an indispensable element in nutrition. This discovery provides scientific corroboration of the popular idea that beef extract increases muscular effort and stamina, for Frankau has shown as the outcome of a long series of carefully controlled experiments (*British Medical Journal*, 1943, II, 601) that addition of nicotinic acid to the diet of healthy young adults produces increased muscular efficiency in undertaking severe tasks involving extra stamina and mental alertness.

"The discovery that beef extract is a rich source of nicotinic acid is of special significance, as the public normally derive the greater portion of their requirements of this vitamin by consumption of beef. In these times of restricted meat supplies there is risk of malnutrition through deficiency of nicotinic acid in the diet. The regular use of beef extract products can be recommended as a means of avoiding this danger. Lemco, Oxo, and Oxo cubes all contain this valuable vitamin."

The report and accounts were adopted.

Overseas Items

Food Problems in Australia

Australia is called upon to redouble her efforts to produce food-stuffs in 1945, especially meat and dairy produce, writes the Melbourne correspondent of *The Times*.

When the drought breaks, and provided that sufficient man-power, machinery, and fertilisers are supplied, the farmers' output of cereals and other foods grown by cultivation can be greatly increased, but meat and dairy produce are in a different category. The peak period in the production of meat, especially beef, in Australia has been passed for some years in the judgment of expert observers. Beef cattle have been maintained at about 9,000,000 head, but it is believed that Australia is very short of young female cattle, and, except in Queensland, in the Northern Territory, the number of store and fattening cattle in sight is alarmingly low. The prospect of a beef scarcity in the southern states in the latter part of 1945 is occasioning concern. It requires several years to restore cattle herds, and there will probably be two or three years' declining output in beef before supplies begin to increase.

Other factors as well as drought have been retarding dairying production. The excessive slaughtering of female calves has produced a scarcity of young dairy cattle, and the onerous conditions of dairying have been too exacting for many producers, who have either curtailed the numbers of cows in milk or have abandoned dairying altogether. Because of the shortages of man-power, machinery, and fertilisers, essential reserves of fodder have not been established, and this has been a further reason for the curtailing of the dairying output.

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Price of 1945 Sugar Crop

It is announced that the British Government has raised the price of sugar for the 1945 crop by £2 per ton.

Sugar Research

Seven leading Canadian sugar companies have joined with the Sugar Research Foundation in its research programme to explore the possibilities of sugar as a basic material for industry and to establish its proper rôle in the diet.

The Foundation includes the growers and processors of cane and beet sugar in the continental United States, Hawaii, Puerto Rico, and Cuba. The President of the Foundation hailed the affiliation of the Canadian companies as an indication of the determination of the sugar industry to plan its own post-war future and said that the Foundation's research programme will make an important scientific contribution to the world of tomorrow. The Foundation is concerned only with research problems and is not interested in any political matters such as tariffs, trade treaties, and quotas, or with any question of production supply or the marketing of sugar.—*Reuter*.

Air Transportation of Fresh Edibles

The post-war possibilities of shipping perishables and edibles by air were demonstrated recently in the flight of a full plane-load of fruits, vegetables, fish, and flowers from the Pacific coast to an "air-borne perishables clinic luncheon" at New York.

A cargo-liner of United Air Lines, being ferried to New York to begin a new trans-continental all-cargo schedule, carried almost 3 tons of perishables picked up at Los Angeles, San Francisco, Portland, Seattle, Tacoma, Spokane, Vancouver, Bellingham (Wash.), Eugene (Ore.), Salt Lake City, Denver, Omaha, Chicago, and Cleveland.

At New York's Waldorf-Astoria 250 representatives of the food, transportation, and research fields sat down to marvel at the variety and naturally ripened flavour and quality of the foods whisked across America overnight. The affair was part of a year-long research programme sponsored by Wayne



Dr. Spencer A. Larsen and Harvey A. Baum inspecting some of the perishables at a New York luncheon.

Food Manufacturi

University, United, and the Great Atlantic and Pacific Tea Company.

Guests were offered samples of such rare fruits as the white sapota, a thin-skinned, large-seeded Mexican fruit cultivated in California; cherimoya, the fruit of a small semi-tropical tree; and passion fruit, a purple-dotted roundish fruit cultivated in New Zealand and now grown in South-Eastern United States.

On the luncheon menu were Dungeness crabmeat cocktails, a "stratosphere" salad of freshly picked Golden State vegetables, Rocky Mountain rainbow trout sautéed in almonds, and a fruit salad containing many delicacies shipped for the first time over a long distance. Other admired items included California strawberries, "defuzzed" peaches, giant youngberries, papayas, dew-fresh sweet corn, asparagus, vine-

ripened tomatoes and melons.

Dr. Warren E. Bow, President of Wayne University; Dr. Spencer A. Larsen, the university's director of air cargo research; H. M. Brundage, New York's Commissioner of markets; Harvey A. Baum, head of A. and P.'s produce buying operations; and J. Prescott Blount, manager of United Air Lines' perishable cargo department, were among the speakers.

Baum declared the luncheon represented a triumph over hazards which usually affect tree-ripened perishables in transit, while Brundage suggested the speed of air transportation could level out temporary shortages and surpluses at farm and market "which result in unreasonable price fluctuations and often disastrous waste of food through spoilage."

Margarine in Eire

For the first time for four years people in Eire will eat margarine. Its production, suspended in 1940 because of the shortage of the raw materials, will be resumed in January, and consumers will get a weekly ration of 2 ozs.

The butter ration at present is 8 ozs. weekly, but it will be cut by 2 ozs. when the margarine reappears in the shops.

* * *

Seizure of U.S. Meat Plant

President Roosevelt has signed an order authorising the Secretary of War to take possession of and operate the plants of the Cudahy Brothers Meat Packing Company in Wisconsin. The seizure is the result of a labour disturbance arising out of dispute with a trade union.—*Reuter*.

News from the Ministries

The Pickles and Sauces Order, 1944

The Minister of Food has made an Order (S.R. & O. 1944 No. 1442) amending the Pickles and Sauces Order (S.R. & O. No. 865). This amendment requires that the statement on the label affixed to a container of any of these products shall specify the name and address of the manufacturer. It postpones the date of operation of the labelling requirements of the Order, so that they come into force on May 1, 1945, for first-hand sales, on August 1, 1945, for sales by wholesale, and on November 1, 1945, for sales by retail.

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Mr. Cecil A. Loombe

Mr. Cecil A. Loombe joined the board of Joseph Rank and other companies in the Rank group on January 1, 1945. It is understood that he will not take up executive duties connected with these appointments while he is serving in the Ministry of Food as Director of Cereal Products.

Ministry of Food in Colwyn Bay

On the conclusion of hostilities in Europe some of the Ministry of Food's work at present conducted from Colwyn Bay will be transferred back to London, whence it was moved in 1940. The balance of the work, with the staff necessary to carry it out, will, so far as can be foreseen, remain at Colwyn Bay for so long as that work continues. It is not possible at this stage to indicate what branches of the work will be transferred nor the number of staff affected.

The Ministry will, in consultation with the staff side of the Department Whitley Council, make every effort to consider the individual preferences of members of the staff and to avoid hardship. A considerable proportion of the staff has, of course, been recruited locally.

The Colwyn Bay establishment totals 4,750. In general it forms the main executive headquarters of the Ministry, the political and policy headquarters being in London.

Return of Empty Containers

The Ministry of War Transport Road Haulage Organisation has made arrangements for effecting the immediate return of empty packages of all descriptions, *which are urgently required*.

Unless the vehicle which delivered the goods is needed for more essential traffic, it will be used for returning such empties, provided that the person offering the full packages to the Unit Controller (for distances in excess of 60 miles) or the Area Road Haulage Officer (for short distances) satisfies him that the empties must be given priority treatment. Where it is not possible to use the same vehicle, Road Haulage Organisation Officers will do their best to find alternative vehicles for doing the work.

The Road Haulage Organisation can also be asked to provide facilities for the return of empties which, when full, may have been forwarded by rail.

The railways will make every endeavour to provide facilities for returned empties which, when

full, were carried by them, and will also carry empties where the "fulls" were delivered by road vehicles. Empties carried otherwise than by rail on their full journey are accepted for return by rail as merchandise and charged at merchandise rates and not at the returned empty rate.

Traders who are in any difficulty in respect of movement of empties for fruit and vegetables should at once contact either the Fresh Fruit and Vegetables Area Officer or the Assistant Divisional Food Officer (Transport) in the area from which the packages are to be moved.

* * *

Imports of Wine and Brandy

The Ministry of Food, in consultation with the Australian and South African authorities, hopes to arrange for the importation during 1945 of 3,600 tons of wines and 600 tons of brandy from each Dominion in approximately equal monthly shipments. Such arrangements would be subject to review from time to time in the light of the prevailing shipping position.

The maximum retail price of the port and sherry type wines will be 12s. 6d. a bottle, and of the beverage wines 8s. 9d. a bottle.

The maximum retail price of the brandy will be announced at a later date.

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Cooking Grey Squirrel

The Ministry of Agriculture says: "First catch your grey squirrel. Skin and clean it as you would a rabbit, and soak it in water overnight. Then chop it into conveniently sized pieces. Melt some margarine or dripping in a stewpan, dip the pieces of squirrel in flour and fry until the flour is well browned. Then add one pint of stock, one large onion and a little parsley, season with salt and pepper, stir the whole until it boils, and simmer for two hours.

"There will be no need to try this on the dog. As a test case, try it on some member of the family who doesn't know what it is, and ask him or her if it isn't good!"

Mr. P. G. R. Whalley

Mr. P. G. R. Whalley, Deputy Secretary, Supply Department, Ministry of Food, resigned his post on January 31, 1945.

The Minister has accepted his resignation with great regret and desires to take this opportunity of expressing his high appreciation of Mr. Whalley's service to the Ministry.

* * *

Vaccine for Foot and Mouth Disease

The Ministry for Agriculture has issued a statement on declarations made in the House of Commons on vaccine against foot and mouth disease, saying that the Argentine authorities appreciate the importance of the problem and are preparing the vaccine as advised by the British representative, Captain Vincent Boyle, in increasing quantities. The statement adds that tests taken on 10,000 animals and their results give grounds to hope for practical results.

The Ministry expressed appreciation for the collaboration between the Argentine stockbreeders and the Virus Research Station of Pirbright, with whom close relations are being maintained.—*Reuter's Trade Service.*

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Agricultural Advisory Service

Following on the recent appointment of Mr. J. A. Scott Watson as Chief Education and Advisory Officer to the Ministry of Agriculture and Fisheries, the Minister, in preparation for the setting up of a National Agricultural Advisory Service, has appointed the following as senior education and advisory officers from January 1, 1945: Mr. F. Rayns, O.B.E., M.A.; Mr. W. K. Slater, D.Sc., F.I.C.; Mr. H. V. Taylor, C.B.E., D.Sc., A.R.C.S., V.M.H.

Mr. Rayns's appointment is on a part-time basis, and he will continue to act as Director of the Norfolk Experimental Station, Sprowston. He is succeeded as executive officer to the Norfolk War Agricultural Executive Committee by Mr. J. C. Mann, who was deputy executive officer of the Committee.

Thanks the Food Trades

The Minister of Food, the Right Hon. Colonel J. J. Llewellyn, M.P., thanks the food trades for their work during the past year. In a special message the Minister says:

"The food traders of this country have completed yet another year of strenuous work.

"By their loyal co-operation with this Ministry our food supplies have been fairly distributed to all.

"The importance of this contribution to the well-being and steadfastness of the home front cannot be overestimated. Both before and after D Day traders have had to cope with difficult problems of transport and manpower, but they have come through with flying colours.

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"Cull" Apples

The Ministry of Food has decided to issue permits to licensed exporters to consign "culls" grade apples in "X" types (AX and BX) non-returnable standard Northern Ireland containers from Area 3 (Northern Ireland) to Area 1 in Great Britain, as defined in the Home-Grown Apples (Maximum Prices) Order, 1944 (S.R. & O. No. 892). Intending exporters should apply for licence to the Department of Agriculture for Northern Ireland, Stormont, Belfast.

Traders are reminded that the lower transport allowances in the price schedules of the Order relative to Area 1 will apply to these shipments, and that, as no provision is made in the schedules applicable to Area 1 for sales by the box, sales by wholesale in Great Britain must be made by reference to the per hundred-weight price specified.

* * *

Barley for Distilling

To enable distillers to complete their manufacture of whisky this season, supplementary licences for the acquisition of the remaining quantities of barley authorised were issued by the Ministry of Food on January 1, 1945.

The production from this allocation, together with that from the provisional allocation made in October, will be approximately one-third of 1939 production.

Food Manufacture

Information and Advice

Bottling Shell-Fish

9,636. *Required, advice on the bottling of shell-fish, such as cockles, crayfish, etc., preservatives used, length of keeping, also cost of machinery for bottling same.* (Lancs.)

The following indications may be taken as a basis for experiment, and obviously it is necessary that the operations described be handled by someone who knows something about canning and preserving, as such an important matter as preserving food cannot be undertaken by recipes alone.

One method for preparing crayfish is by boiling for 1 minute in fresh water, draining, putting in wooden buckets with a handful of salt and shelling as soon as cold. The fish are then packed into glass jars, leaving as little empty space as possible and covered with a 3 per cent. hot salt brine. The jars are sealed while hot.

Processing is carried out as follows:

$\frac{1}{2}$ pint size: 16 mins. at 220° F. or 40 mins. in boiling water.

1 pint size: 20 mins. at 220° F. or 60 mins. in boiling water.

Some experimental batches should be made to check up sterility. This may be done by incubating for a week or so.

Cockles are steamed for about a minute, taken out of shells, packed in jars covered with brine and processed as follows:

$\frac{1}{2}$ pint: 35 mins. at 220° F.

1 pint: 50 mins. at 220° F.

1 quart: 70 mins. at 220° F.

The jars should be cooled immediately afterwards in cold water, adding the cold water gradually so as not to break the jars.

No preservative must be used, nor is it needed if sterilisation has been carried out properly.

It is necessary to have a licence for carrying on this work.

With regard to the cost of equipment, this would be very difficult to obtain at the moment, but it might be purchased second-hand.

Artificial Cream

9,647. *Required, some information on the formulae, methods of production, etc., of artificial cream used as a filling in bakery products.* (London.)

The following war-time formula is given by Bennion and Stewart in their book *Cake Making* (Leonard Hill Limited):

6 lb. water.

6 oz. cornflour.

$\frac{3}{4}$ lb. unsalted margarine or cooking fat.

$\frac{1}{2}$ gill egg yolks.

Make a paste of the cornflour and a portion of the water. Boil up the remainder of the water, add the cornflour paste, and cook until it gelatinises, but keep stirring to prevent it burning or forming lumps.

Cool the mixture to 150° F., and add the melted fat slowly to it while stirring. When the mixture reaches 130° F., add the egg yolks and pass through the emulsifier. Store the emulsion in a refrigerator for some hours before use. Whisk up to the consistency of whipped cream while it is still cold.

Information Supplied

9,596. *Information concerning sausage humidifying and cooling machines.* (Lancs.)

9,597. *Names of suppliers of factory floors.* (N. Ireland.)

9,603. *Names of makers of Vitamin D₃.* (Eire.)

9,605. *Information regarding the manufacture of cold mix ice cream powder.* (Durham.)

9,607. *Name of makers of Cox's burner, known as the "Combustor Sugar Boiler."* (Lancs.)

9,609. *Information regarding Worcester sauce and sweet pickles.* (Sussex.)

9,611. *Information regarding the food regulations in European countries before the war.* (London.)

9,633. *Names and addresses of manufacturers of beeswax, paraffin wax, butyl acetate, amyl acetate, cellulose acetate, "Cellasolve," Neuberg chalk, powdered pumice stone and bentonite.* (N. Ireland.)

9,634. *Names and addresses of soya flour manufacturers.* (Eire.)

9,635. *Names and addresses of the manufacturers of filling and packing machinery.* (London.)

9,639. *Name and address of the makers of Sterno-cense.* (Somerset.)

9,646. *Names and addresses of manufacturers of a machine for packing cartons with cut candied peel, machine for filling about 4,000 dozen jars with mince-meat, and a machine for filling pickled vegetables into jars.* (Middlesex.)

9,672. *Information regarding fruit juice pasteurisers.* (Lancs.)

9,680. *Name and address of manufacturers of plant for the vacuum packing of pure ground coffee.* (Scotland.)

9,681. *Names and addresses of suppliers of soya beans (whole).* (Lancs.)

9,682. *Names and addresses of suppliers of biscuit-making machinery.* (N. Ireland.)

9,683. *Names and addresses of suppliers of gum dextrine.* (Eire.)

9,684. *Names and addresses of firms supplying white of egg substitute.* (Dorset.)

9,685. *Information regarding the manufacture of citrus fruit juices and the names and addresses of firms making machines for the preparation of vermicelli.* (Northumberland.)

Information Required

9,761. *Names and addresses of English millers or importers of peanut flour.* (London.)

Recent Patents

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

Improvements in and relating to the Production of Syrups from Starch

This invention relates to the production of syrups from starch and has for its object to enable the production of a syrup containing substantial quantities of reducing sugars but devoid of dextrose from water suspensions of starch, more particularly relatively heavy suspensions of the order of 13° Beaumé upwards, without preliminary modification of the starch by acid action or by the action of chemical oxidising agents.

The starch suspension is first subjected to the action of a bacterial enzyme which is capable of reacting with starch in water suspensions in such a manner that the starch is liquefied to the extent that suspensions of starch, even of a concentration as high as about 100 parts of anhydrous starch in 250 parts by weight of water, remain fluid at the gelatinising temperature of starch, whereas a suspension of similar concentration of untreated starch would become a thick paste at the gelatinising temperature; this modification being accomplished without any great degree of saccharification of the starch, after which the saccharification of the starch is brought about by malt or other vegetable diastatic inversion. The process can be applied usefully to starch suspension above 7° Beaumé and is particularly advantageous with relatively heavy suspensions, since by enabling the use of high density starch suspension it involves less evaporation of water with considerable economy in fuel. The proportion of diastase (or diastase-bearing commodities such as malt and malt extract) required in carrying out the present process is considerably less than is customary in diastase inversion and may be of the order of 5 per cent. or more.

The starch suspension is first subjected to the action of the bacterial enzyme under heat. In this way, the starch is so modified that gelatinisation under adequate heat is no longer possible. The modified starch is then mixed with crushed malt (e.g., 5 per cent.) or malt extract and is maintained at a suitable mashing temperature (e.g., 150° F.) until the desired degree of saccharification is reached.

The resultant liquor is then subjected to the usual refining processes and evaporated to the desired density.

Examples of bacterial enzymes which may be employed are those obtained from *B. subtilis*, *B. vulgatus* and *B. mycoides*.

561,706. Alfred Eveleigh Audsley Beaver and Corn Products Company, Limited.

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.

563,945. REAVELL, J. A.: Methods of and means for evaporating liquids in bulk.

563,968. AKTIEBOLAGET G. AREHNS MEKANISKA VERKSTAD.: Bag-feeding machines.

563,971. GLAXO LABORATORIES, LTD., and HOWKINS, A. G.: Devices for delivering liquid in drops.

564,020. SMITH, A. V., TREVIS, C. A., and SPAREY, A. F.: Machines for digging and bagging potatoes and like bulbous root crops.

564,032. VICKERS-ARMSTRONGS, LTD., WOOD, H., and WILKINS, H. C.: Filters for liquids.

564,069. THYNE, LTD., W., and MURRAY, A.: Collapsible cartons.

564,098. TECALEMIT, LTD., and LE CLAIR, C. C. S.: Oil or other liquid filters or cleaners.

564,105. ARON, W. E.: Apparatus for cleaning, dressing, grading and airing grain, seeds, peas, beans, cereals and the like.

564,120. SIMON, LTD., H., and BAGG, H. A.: Driving arrangements of rotary reels for sifting granular and like materials.

564,206. SMITH, S. H., and IMPERIAL CHEMICAL INDUSTRIES, LTD.: Valve for controlling the flow of fluids.

564,218. GARRICKS (CATERERS), LTD., and STEEL, D. W.: Apparatus for preparing tins for baking buns, cakes, and the like.

564,239. HILL, W.: Lift and trip gear for land-cultivating and root crop lifting machines.

564,270. TATE AND LYLE, LTD., and WHALLEY, H. C. S. DE: Inversion of sugar liquors.

Trade Marks

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.).

NESMILCOA.—629,084. Preparations consisting principally of milk or milk products and containing extracts of the cocoa bean, for making beverages. **Nestlé Milk Products, Ltd.**, 6 and 8, Eastcheap, London, E.C.3; Manufacturers.

ALMALIN.—629,761. Flavourings for food (other than essential oils). **Scottish Flavour and Colour Co., Ltd.**, Mayfield Works, 27 and 29, Ratcliffe Terrace, Edinburgh; Manufacturers and Merchants.

TRUBUREX.—629,979. Flavourings for food (other than essential oils), flour, bread, biscuits (other than biscuits for animals), cakes, pastry, and confectionery (not medicated). **Scottish Flavour and Colour Co., Ltd.**, Mayfield Works, 27 and 29, Ratcliffe Terrace, Edinburgh; Manufacturers and Merchants.

New Companies

Goodyear, Ford and Company, Limited. (389679.) 134-135, Windsor House, Victoria Street, S.W. 1. To carry on business of caterers, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: R. Hamilton and Mrs. M. F. Hamilton, both of 137, Old Claygate Lane, Hinchley Wood, Esher; G. D. B. Milner and Mrs. E. Milner, both of 84, Old Claygate Lane, Hinchley Wood, Esher.

W. Jurgens and Co. (Sittingbourne), Limited. (389731.) To take over business of manufacturers and preservers of foodstuffs carried on at Europa Place, Lever Street, London, as "W. Jurgens and Co." Nom. cap.: £6,000 in £1 shares. Dirs.: A. H. Calder, 36, Marshalswick Lane, St. Albans, Herts; E. W. J. Belcher, 39, Broxholm Road, S.E. 27.

A. E. Street, Limited. (389733.) 18-20, Brunswick Road, Shoreham-by-Sea, Sussex. To take over bus. of a baker, café propr., etc., carried on as "A. E. Street" at Shoreham-by-Sea. Nom. cap.: £3,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: Ethel C. Street and Dorothy C. Hills, both of 18-20, Brunswick Road, Shoreham-by-Sea.

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