County of Somerset

ANNUAL REPORT

OF THE

COUNTY ANALYST

FOR THE YEAR

1969

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County Analyst.

SOMERSET COUNTY LABORATORY

Staff at 31st December, 1969.

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SOMERSET COUNTY COUNCIL

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ANNUAL REPORT OF THE COUNTY PUBLIC ANALYST FOR THE YEAR 1969

Mr. Chairman, Ladies and Gentlemen,

I have the honour to present my twelfth Annual Report on the work of the County Laboratory.

Once again some six thousand very varied solids and liquids, mainly edible but some highly inedible, have been received in the Laboratory. These are tested or examined by physical, chemical and instrumental means which are under constant review and improvement, to keep pace with the rocketing changes of industry. The Infra-Red Spectrophotometer, recently purchased, for instance, shows that analysis need not mean a breaking-down into component parts any more, since a tracing of the molecular structure of an oil or plastic film, say, can be achieved without any material destruction; the instrument should prove immensely useful in many fields, especially for drug analysis.

One exercise of value during the year has been the analysis of well over a hundred samples of liver, mostly from pigs, for toxic metals, the results showing some cause for concern. Feeding arsenical compounds to pigs, as growth promoters, can possibly produce a build-up in the liver exceeding the level of 1 part per million applied to foodstuffs by Regulation.

Problems from other sources in the County have included the contamination of caves, collars and cream, the excretion of drugs and the installation of petrol tanks, calories in chick mash and fungicides in fish. Many of these are, of course, closely related to the major subject of Pollution, so much discussed in this National Conservation Year. Interest in this topic would seem to be newly-created in some quarters, but has, in fact, always been one of the chief concerns of the public analyst and will continue to exercise this Laboratory, in all its everchanging aspects.

Talks were given on 16 occasions, in many different parts of the County, to Public Health Inspectors, Rotary Clubs, Young Wives, Women's Institutes etc., the subject usually being "The Work of the Public Analyst" (suitably illustrated), but sometimes meeting a request for some special subject, such as Swimming Pools or Pesticides.

Staff changes have made it difficult to keep up with work programmes at times. One member left in May and could not be replaced until September, while an additional analyst was appointed only in November. Training of new recruits, by the more senior analysts, also takes time at first, and I should like to thank every member of the staff for their skill and service during a year of change and development. It is also a pleasure to say how much I appreciate the interest and support of colleagues and Committees.

I am, Mr. Chairman and Members,

Your obedient Servant,

JOAN D. PEDEN

February, 1970.

LEGISLATION

The fastest bit of law-making for a very long time took place at the end of the year and resulted in a ban on the use of cyclamates, as from 1st January, 1970. The official history of these compounds in this country has been short and (artificially) sweet, lasting just 4½ years. They were not even mentioned by name in a Report on Soft Drinks, made by the Food Standards Committee in 1959, which considered the use of the synthetic sweetener, saccharin, and did, in fact, state that "we remain of the opinion that it would be more consistent with the general intention of the Food and Drugs Act . . . if soft drinks were now required to be sweetened entirely with sugar . . . Our recommendation is therefore that the use of saccharin and other artificial sweeteners in soft drinks should be prohibited".

Trade interests or other factors evidently prevailed, since the ill-fated 1963 Regulations did lay down limits for non-prohibited saccharin. Revoked before birth, this instrument was replaced by the 1964 Soft Drinks Regulations, which have operated since June 1965, the major compositional change being the permitted use of cyclohexyl sulphamic acid and its salts, sodium and calcium cyclamate, in quantities 15 – 20 times the saccharin levels. They had been used for many years with official approval in the United States.

For some reason, these compounds became the subject of public concern and this was increased by the publication of a piece of rather thin and questionable research, carried out in America, on the production of tumours in rats by over-feeding with cyclamate. A man drinking 500 glassfuls of orange squash every day of his life might just approach the enormous dose rate to rats, it was calculated, and certainly one must agree that a man drinking this much had better stop, for one reason or another.

It was finally announced by the Minister on 23rd October that the use of cyclamates would be banned, and on 1st November a leading article in Nature commented "If the new evidence had shown that cyclamates transmuted into arsenic at the drop of a hat, the substance could not have been banned more quickly"; the American evidence, it went on was "about as solid as candy floss". Medical journals, nevertheless, gave a measure of cautious approval and one suggested that saccharin should be investigated also, so it may well be that the 1959 recommendations are implemented at last.

Necessary changes were made to produce the new cyclamate-free **Artificial Sweeteners in Food Regulations, 1969** and **The Soft Drinks (Amendment) Regulations 1969**, made 17th December, 1969 and coming into force 2 weeks later.

A Code of Practice for **Marzipan, Almond Paste and Almond Icing** has been published with the agreed standard of 23.5 per cent dry ground almonds in these synonymous articles, and the Food Standards Committee issued a Report on **Condensed Milk** with a view to improving the present Regulations and bringing them into line with those governing Dried Milk. The Report includes a section on usage, in which it is estimated that 70 per cent of the evaporated (unsweetened) milk sold is used as a substitute for cream, 3 per cent as a baby food, 22 per cent for use in cooking or manufacture and 4 per

cent in beverages—which raises the interesting question of how we use the other 1 per cent? Sweetened condensed milk is used in the home mainly for cooking and sweet-making, it is stated. Six categories are suggested, covering Full Cream, Skimmed and Partly Skimmed Milk, both Sweetened and Unsweetened, with appropriate requirements for fat and milk solids contents.

A Bill was presented to Parliament in October "to make provision with respect to agriculture and related matters and with respect to flood warning systems; and to amend the Diseases of Animals Act, 1950 as respects importation and treatment by serum or vaccine" and Part IV of this Agriculture Bill relates entirely to Fertilisers and Feeding Stuffs; the principles are much the same as those of the current Act on these substances, but many of the details differ. Clause 74 does for instance, give purchasers the right to have fertilisers and feeds officially sampled and analysed within six months of delivery, in place of the present fourteen days, which seems to be going from one extreme to the other. Under the present Act of 1926 feeding stuffs are confined to foods for bulls, cows, oxen, heifers, calves, sheep, goats, swine and poultry. The proposals in the Agriculture Bill would widen the scope to control the diet of all animals 'kept for the production of food, wool, skins or fur or for the purposes of their use in the farming of land' and includes any birds or fish. This would then cover rabbits, mink, trout, pheasants and many other lesser breeds formerly outside the law. It may even include the animal apparently provided for the use of the Eggs Authority, which is defined in the same Bill as 'a body corporate with perpetual succession and a common seal'.

UNSATISFACTORY FOODS

Very nearly 3,000 samples were analysed under the provisions of the Food and Drugs Act, excluding Appeals-to-Cow and Private samples. The 2,989 foods, drugs and milks sent in by the Chief Inspector of Weights and Measures included 75 samples returned as unsatisfactory.

The reasons were, as usual, many and varied. Some offences are immediately obvious, such as the fly in the ointment or beetle in the bun. Regulations provide for the simple excess or deficiency of a food, like too much water in butter or too little iron in flour, based on direct determinations, while others depend upon the complex set of calculations needed to give the meat content of a Sausage roll or estimate the fruit in strawberry jam. Needless to say, fresh Regulations regularly appear, so the trade and the analyst must keep up to date.

Codes of Practice, when standards are agreed with the trade, can be most helpful, as establishing a good commercial level for some commodities, but these are relatively few, and the negotiators tend to have long white beards before the final draft is approved by all possible parties.

After that the analyst is on his own, using his experience and judgement on the staggering supermarket array of pre-packed foods which seem to reach new heights of fantasy each year. Vodka-flavoured lemonade, whisky sauce for shrimp cocktails, canned cannelloni al sugo, sardine and raisin seasoning for macaroni, jellied eels and peach-flavoured cellulose for slimmers are some of the more exotic recent samples.

Advertising, and its impact on the consumer, is another important factor; the law on labelling is very detailed in some ways and wide open in others. A list of ingredients is necessary for a compounded food but water, often the major constituent, need not be mentioned, a Registered Trade Mark is a poor, but quite legal, substitute for a name and address and the whole general tenor of title, claims and pictures may be decidedly misleading, although fractionally within the law. Misleading in the analysts opinion, that is, although this is a matter for magistrates to decide and, on this point, the valuable view is that of the man in the street or woman in the shop.

Public expectations are among the hardest things the analyst must determine. Does the consumer expect cream in cream soup, butter in shortbread or in butter puffs, bone in oxtail soup, dye in kippers, salmon in fish paste, rum in rum flavour, flour in mustard, egg white in meringues, real chocolate on cheap cakes? and if so, how much? Only the best-informed and least-harassed housewives could provide definite answers and, even then, one could hardly expect them to be all the same. However, problems must be solved and decisions made, as can be seen in the following pages.

MEAT PRODUCTS

This is really something of a special year because, for the first time, there are no low sausages to report. All the 41 pork, the 20 beef and the odd blended sausage were passed as genuine, the vast majority because they were of good composition and the odd one or two by reason of the curious and wonderful workings of the new Sausage Regulations. Before they operated, criticism of the over-fatty sausage was fairly simple—fat must not exceed lean, which was taken to mean the totally defatted portion, determined by analysis. Now "lean meat" is defined officially as "free from visible fat"—a very different matter, since this may mean anything from 2 to 18 per cent "invisible" fat, distributed as small granules throughout the mass. The final product can therefore contain a very definite excess of fat and still be legally acceptable nowadays. The actual results are tabled below:

	Pork Sausages	Beef Sausages
Number of Samples	41	20
Average Meat Content per cent	70.8	64.0
Range of Meat Contents per cent	84.1–65.0	80.5–54.7
Range of Fat Contents per cent	40.1–11.2	26.7–13.2

The operation of the Meat Pie Regulations has also led to great argument. A general standard of 25 per cent meat in pie, modified down to 12.5 per cent if vegetables are used in the fillings, as per cornish pasties, is all very well, but the subtler variations for differing weight classes in the smaller pies, the presence of egg or cheese, the composition of the pastry, even the place of origin, are confusing, to say the least. Dotting the i in every conceivable pie, and crossing the t of each peculiar pasty has not produced a good instrument. Cornish pasties are probably in the poorest position from the consumer's point of view, and, thanks to the lack of restriction on the fat content, together with a generous allowance for the fat in the pastry case, it is possible to wind up with the apparently high meat content of 24.2 per cent, according to the Regulations. In actual fact, this is made up of 16.6 per cent fat and only 7.6 per cent lean meat. We therefore

have the idiotic position that the pasties would have complied with the Regulation 12.5 per cent meat if they had contained no lean meat at all, but had been stuffed with starch and suet.

Nevertheless, criticisms were made concerning 6 such samples, mainly for misdescription. **Steak Pies** were actually filled with a mixture of meat and onions, the proportion of meat per pie being only 18.5 per cent; this merely qualified them for the description Meat and Vegetable Pies, or, more specifically, Steak and Onion Pies. They also illustrated another difficulty in sampling such non-uniform articles, since the filling in one of the two pies which made up the whole sample was only two-thirds the weight of the other one. So it follows that quite often, half the sample is above, and half the sample is below, the right standard. This is both a legal and a commonsense problem and can be taken to the extreme of wondering, as one colleague points out, if one bad bullseye damns the whole bagful. Average values are not always the answer, demonstrated by the man who drowned in a river of average depth three feet.

A Steak and Kidney Pie had as little as 14.1 per cent meat, without benefit of diluting veg., and this was probably due to a gross excess of pastry in relation to filling. The vendor apparently bought them in an uncooked state and just popped them into the oven; a formal sample of the raw pies has since been analysed and passed as almost exactly minimal standard. Another **Steak and Kidney Pie** contained 21.3 per cent meat, below the general limit of 25 per cent. A pie weighing less than 7 ounces has special provisions, however, and if it is also more than 5 ounces is only required to contain 1.5 ounces of meat. This pie weighed 6.3 ounces and had a meat content of 1.33 ounces, still on the low side. The manufacturer decided to acknowledge the presence of onion in his title, which takes the product into a lower meat category, anyway. The makers of three anonymous **Pasties** were advised of the need to be more informative as to fillings, all of the meat, potato and onion variety. One tired labeller christened his product "Meat Pot and Onion" but no cannabis could be detected.

Difficulty in understanding the Regulations explained another deficiency. The pasty maker thought that the standard applied to the filling mix only and 12.5 per cent of that as meat would be sufficient, regardless of pastry case.

Canned meats included a ready-mixed **filling for Cornish pasty**, with the same small labelling error that was supposed to be put right back in 1966; "old stock" was the explanation. A can of **Stewed Steak in Rich Gravy** contained rather more gravy, however rich, than the law now allows and the meat content had been lowered from the minimal 75 per cent to 67.9 per cent; the firm was to improve its quality control system in future. Judgement of another product depended upon the exact percentage of onion it contained: **Minced Steak and Onions with Gravy** should have 50 per cent of meat, if the onion content exceeds 12.5 per cent, and 75 per cent meat if less onion is present. In actual fact, it had only 44.4 per cent meat, so was low in any event, and has been taken off sale. Another sample, of good quality and reasonable meat content, was criticised for lack of mushroom. It would be useful to know just what the public expects from a can labelled **"Curried Chicken and Mushrooms"**, but fair to say that most would be disappointed by the finding of only two small stalks and one fragment of mushroom cap in a whole canful of curry. Further samples showed some improvement, each containing three whole smallish mushrooms, which was passably better, if not precisely generous.

The Lead in Food Regulations allow a maximum level of 5 parts per million lead in canned meats and this was exceeded by a sample of **Corned Beef** from Argentina, which contained 9.4 parts per million. Two repeat samples showed low levels of lead, so the offending can had obviously been subject to some individual contamination, possibly by solder in sealing the seam.

During the project for surveying the toxic metals in fresh liver, which is discussed more fully under the heading of Miscellaneous Samples, 1 formal and 12 informal samples were examined under the Food and Drugs Act which failed to meet the standards set and these are listed below, the appropriate limits of metals being:-

1.0 part per million arsenic
2.0 parts per million lead
50.0 parts per million copper

Sample	Amount of Metal Present
Pigs Liver	12.0 p.p.m. arsenic
Pigs Liver	185.0 p.p.m. copper
Ox Liver	85.0 p.p.m. copper
Pigs Liver	57.0 p.p.m. copper
Pigs Liver	3.5 p.p.m. arsenic
Pigs Liver	2.5 p.p.m. arsenic
Pigs Liver	1.2 p.p.m. arsenic
Pigs Liver	102.0 p.p.m. copper
Pigs Liver	1.2 p.p.m. arsenic
Lambs Liver	60.0 p.p.m. copper and 2.7 p.p.m. lead
Ox Liver	92.0 p.p.m. copper
Ox Liver	96.0 p.p.m. copper
Pigs Liver	62.0 p.p.m. copper

A single fish product failed to make the grade: a **Dressed Crab** of Norwegian origin was a trifle low in crab meat. When the Fish and Meat Spreadable Products Regulations eventually come into force in the middle of March 1971, dressed crab will have to contain 93 per cent fish and most brands do actually have more than this at present. The sample in question contained only 88.7 per cent crab and the makers admitted that they only aimed at 90 per cent anyway.

DAIRY PRODUCTS

A total of 1,728 milk samples was received under the Act: 987 formal ordinary milks, 713 formal Channel Island milks, 16 private complaints and 12 appeal-to-cow samples. Of the 1,700 milks sampled formally by County Weights and Measures Inspectors, only 12 received adverse reports, which is a mere 0.7 per cent of an adulteration rate. Last year there were 33 unsatisfactory milks out of a total of 1,804 samples.

Milks sampled by the County Health Inspector have been regularly checked for antibiotics since 1963, and this year a special effort was made, since reports from a neighbouring county seemed to show that an increase in this form of contamination was possible. For many years the findings have been almost entirely negative in Somerset, with no more than 2 or 3 positive in the hundreds of farm milks tested.

For the first time the total of 996 samples included 57 samples of cream, but none of the creams contained any antibiotics. There were 11 of the 839 milk samples found to contain traces of penicillin and these actually came from only 5 farms. The results can be briefly tabulated as follows:-

Farm	Penicillin (I.U./ml)	Time
1	0.10	February
2	0.80, 0.07, 0.075	February–March
3	0.05, 0.05, 0.05	April
4	0.08, 0.05	July and August
5	0.12, 0.08	August

In every case the farmer was warned and, generally, the dairy and Ministry informed; the supply was invariably found to be satisfactory on further check sampling thereafter.

Two samples of **Butter** was found to have rather more water than Regulations permit, and a **Double Cream** slightly less fat than the requirement. Contrariwise, a **Low Fat Curd Cheese** had more fat than one should find in this cottage type; 14.5 per cent fat lies outside the per cent range, and qualifies a cheese for the description Medium Fat Curd.

Full Fat Soft Cheese should have been used to describe a **Danish Mozzarella,** which normally comes from Italy. In this case, it was really intended for the United States, to complicate the position still further, but had accidentally arrived in Britain. Here the phrase "Low Moisture" is frowned upon when applied to an article containing 49.0 per cent water and the sample, which closely resembled a slab of completely tasteless white plastic, was criticised accordingly.

CEREALS

Only a few samples qualified for comment in this section. The need to reinforce white flour with powdered chalk, to provide essential calcium in the diet, has led to some practical difficulties in the event. It is fairly easy for a benevolent Minister to lay down limits of 235 and 390 milligrams chalk per 100 grams flour, by thinking of a couple of numbers at random, but harder for the miller to ensure exact compliance. Two samples of **Flour** were found to be deficient of calcium carbonate, one having 150 mgms. per 100 grams; the other was described as Old English Stone Ground but unfortunately contained too little Old English Stone–the chalk was as low as 60 mgms. per 100 grams. A formal sample taken in the area of manufacture was reported by that Authority to be satisfactory.

Some old samples, like soldiers, never die and a certain **Dietetic Wafer** re-appeared for the second time since 1965. The label failed to bear the name and address of the company of manufacture, as had then been promised, and compositional statements were incorrectly given in grains instead of grams, which means roughly 15 times as much. The new management had no record of old agreements but stated that the line would not be renewed.

A product of Western Germany was called **Wheat Diet** and consisted of a mixture of whole wheat flakes, dried yoghurt and apple powder. It contained B-group vitamins and was of satisfactory composition, but had been incorrectly labelled in one respect. A Note for Diabetics stated that the carbohydrates per ounce were approximately 19 grams,

whereas the true figure was nearer to 25 grams, an error of almost 30 per cent; this was acknowledged and amended. Finally, a **Christmas Pudding with Brandy Flavour Sauce** already applied inside the tinfoil. At Lab. temperature, it proved impossible to separate the somewhat tenacious sauce from the main body and the whole minced-up mass was analysed. A fat content too low for satisfaction was the finding, even allowing for dilution by fat-free sauce. The makers agreed that the result was in keeping with their recipe, which would give a fat of about 5 per cent, whereas a good pudding should contain about twice this amount. In the event, however, production had ceased in 1968, so no further action could be taken.

PRESERVES

Many jams, honeys and marmalade were examined during the year and a few showed unsatisfactory features.

One sample, stated to be "the only **100% Honey Orange Marmalade**", posed a slight problem at the outset; with 100% honey, there seemed little room for the necessary oranges. "Honey is a pure food", it said on the label, "easily digested and producing valuable energy" (true), "No preservatives or colouring" (false). The product not only contained sulphur dioxide preservative, but contained it in a considerably higher proportion than the law allows in preserves. A formal sample would have been taken, but no more could be discovered on sale in Somerset. A preserve for diabetics, sold as **Sugar-free Lime Marmalade** was also criticised for certain statements on the label; the required declaration that it was "prepared from West Indian limes and sorbitol" was printed in exceedingly minute lettering, about half the height of the letter 'i' in this type (excluding the dot) and was certainly not conspicuous or clearly legible as it should have been. The main description was also incorrect, in that the marmalade did contain a certain small amount of natural sugars from the limes and was therefore not entirely 'sugar-free'. The modified claim on the label that the product was "exceptionally low in sugar derived from the fruit" was more properly made, but the article has been taken off the market at the present time.

An informal sample of **Blackcurrant Jam** was very low in fruit content, having at most only 16.5 per cent, compared to the legal minimum of 25 per cent fruit. This is fairly low compared to other kinds of jam, since blackcurrants are of such strong flavour and high setting power. A formal sample was just sufficiently better to scrape through the standard; a formal **Apricot Jam** was still low on the necessary 40 per cent fruit content, but did not form the subject of a prosecution.

Two samples of **Honey**, both being imported from abroad and bottled (jarred ?) in this country, were each reported to contain an undesirably high level of hydroxy-methyl-furfural, formed by the breakdown of natural sugars. While of no danger, it indicates either that the honey has been adulterated by syrup or that too much heat has been applied during blending, which is the more usual explanation. The international body trying to reach agreement on food standards, the Codex Alimentarius, has fixed a provisional upper limit, which is being used in this Laboratory.

Another imported item, which might perhaps be mentioned here, was a set of **Food Colours, with Drop Control** from the United States. Countries notoriously differ

greatly in their food laws concerning colouring matters; the sample was labelled correctly, by U.S. standards, listing each dye with reference to the American Colour Index System, but this does not comply with our own Regulations, and was so reported.

DRINKS

Last year some super-concentrated **Orange Drinks** were reported, which contained a super-amount of cyclamate sweetener, over and above the rather odd Ministry limit of 4,666 grains per 10 gallons. (Nowadays, of course, the merest trace of cyclamate is sufficient to condemn the thing out of hand, which seems a little hard on soft drinks.) At the time in question, the same product was again criticised, in view of the fact that the manufacturers had agreed to reduce the quantity of artificial sweetener, and enquiry showed the particular sample to be old stock. The claim to be of "Triple strength" was held to be marginally justified; although the sugar content was not three times as high as usual, it was nevertheless possible to add 12 volumes of water in place of the normal 4 volumes and still have a glassful which satisfied the ready-to-drink standard. The fruit content was satisfactorily high.

A bright-yellow squeeze-bottle of **Lemon Juice** from Sicily was not in the best of condition, having become pale brown in colour, with a deposit of mould spores during its long stay on the grocer's shelf, and the action of yeast-like organisms in the bottle was probably responsible for the high alcohol found in a **Shandy**. The pre-packed article is rigidly confined as far as alcoholic strength is concerned, between the limits of 1.5 and 2.0 degrees proof; below 1.5 it is reported to contain too little ale or beer and above 2.0 it not only contradicts the invariable statement on the label but also becomes an 'intoxicating liquor' under the Customs and Excise Act and can only be sold on duly licensed premises. The makers of this sample were only guilty of failing to exclude fermenting yeast cells from their product and a further sample was quite genuine.

The final drink was decidedly non-intoxicating, being described as **Coffee, White with Sugar and Milk**, although this was not entirely correct. As supplied from its vending machine it contained no whole milk, the small proportion of fat being vegetable in origin. There are times when coconuts are no substitute for cows, and the description was amended.

FRUIT AND VEGETABLES

Some relatively minor criticisms of two **Dried Fruit Mixtures** were made, in that the stated order of sultanas, currants, seedless raisins and cut mixed peel was incorrect, one brand having too many raisins and the other too few. Rather more seriously, a packet of Turkish dried **Figs** was found to be thoroughly infested with mites and some **Muscatels** had been treated with a slight excess of mineral oil. The Mineral Hydrocarbon in Food Regulations 1966 require that dried fruit shall not contain more than 0.5 part by weight of such oil in 100 parts of fruit and this sample had 0.6 per cent. The product is due to be re-sampled at Christmas, being a seasonal line.

A canned apple purée from the Netherlands, submitted as **Stewed Apple Extract**, failed to show the necessary list of ingredients on the label, for which the importers were

cautioned and a rather more exotic **Italian Sweet Peppers in Wine Vinegar** was labelled in various languages which did not include the correct declaration of contents either in nature or quantity. A Spanish **Fruit Salad** was also reported to have a slight labelling contravention.

Spanish **Olives** stuffed in Somerset proved to be somewhat disconcerting when tasted (or 'subjected to an organoleptic test') by the chief olive-fancier on the staff. Instead of the distinctive and salty flavour, normally found in these delicacies, they closely resembled rather soggy pickles; it turned out that the manufacturers had really meant to pack their product in brine and were somewhat surprised to find that a volume of vinegar had been included.

Canned **Chopped Spinach** of unknown foreign origin came with a multi-purpose label depicting a wide variety of vegetables, and the lightning glance of the shopper in the supermarket would probably have been deceived into thinking it was some sort of salad. It really was a solid mass of spinach, however, containing more of the toxic metal lead than is allowable under Regulation; the formal sample also had an excess of lead. Unfortunately, this sample illustrates the difficulty of enforcement while the law allows identification by means of a Registered Trade Mark alone. It was not possible for the Chief Inspector to trace the source of supply with any certainty for some time, until it was finally discovered that the proprietors of the Registered Trade Mark were no longer in business, and no further action could be taken, except to check on any other sales in the County.

DRUGS

The first drug which was subjected to criticism, of the 187 examined, was a **Golden Massage Balm** "for Rheumatism, Lumbago, Stiff Joints, Sprained Ankles"; it was a strongly odoriferous ointment smelling of wintergreen. The British Code of Advertising Practice has a long list of illnesses or conditions (including asthma, dermatitis, obesity and squint) for which medicines may not be advertised, and this includes any form of publicity or packaging. Among these, indigestion, insomnia, and rheumatism share the modifying proviso that only reference to a 'chronic or persistent' condition is wrong, under the Code, since some relief can be claimed for transient troubles. Benefit of this doubt was extended to the present product, but the manufacturing chemists in London had failed to comply with the Pharmacy and Medicines Act, by omitting to list the active ingredients of their Massage Balm on the label. It turned out to be a very old and slow-selling line which was no longer being made at all.

A sample of **Soothing Powders** had an even longer historic background. Sold to mothers for the relief of their babies during teething pains, they were originally made from calomel, a mercury compound, until doctors traced infant deaths from Pinks Disease to the use of this toxic metal. The formula of the powders was then entirely changed, but not altogether for the better, since they now consist of starch, sugar and a fairly drastic laxative. The question arises of exactly how soothing, in all circumstances, a dose of purgative can be? Medical opinion supports the view that it is not always appropriate, but the most important person can't yet speak for himself, babies being inarticulate although hardly dumb.

Some **Back, Kidney and Bladder Pills** did contravene the Code aforementioned by labelling which claimed an effect upon various kidney complaints, gravel, catarrh of the bladder, etc. They also contained podophyllum resin, a very strong purgative, without some constituent such as hyoscyamus to prevent griping, the potassium nitrate content was incorrectly stated and all quantities given in the apothecary system of minims and grains, instead of the official metric measures. All things considered, the product was wisely taken off sale.

Two vitamin products were adversely reported: a **Vitamin Syrup** had lost condition and become turbid, with a waxy orange-coloured deposit, which was probably the vehicle for the added vitamin A, since this was deficient. A further sample from the dispenser's bulk stock has now been examined and found to be of good condition and vitamin content.

Multivitamin Tablets were stated to contain some 12 vitamin compounds and the elements copper, iron, iodine, calcium and phosphorus, which makes a comprehensive supplement. Analysis showed, however, that there was a considerable deficiency of iron. The tablets were claimed to contain 15 milligrams in four tablets, a rather unusual manner of statement, based on the fact that 4 tablets were a daily dose; the actual figure was only 5.8 milligrams, and a formal sample was submitted. The omission of iron can only have occurred in the particular batch first examined, for the second sample had over 17 milligrams in 4 tablets, and was, of course, satisfactory.

Finally, a **Linctus for Stubborn Coughs** had only one-tenth of the stated amount of chloroform, which was eventually explained by a clerical error on the label. After the adjustment of a decimal point, the chemists formula equated to the Laboratory's finding.

PRIVATE SAMPLES

This section produces the most interesting collection of oddities under the Act, reflecting as it does the manufacturer's mistakes, the retailer's failure to rotate his stock and even an occasional lapse by the wholesaler. It must be said also that it often demonstrates a quite unfounded suspicion on the part of the purchaser, which the analyst is glad to dispel.

Only 3 of the 16 complaint milks were exonerated, however, the remainder showing some undesirable feature, like broken glass, bird droppings, insect fragments, cement, mould growth, absence of fat or presence of disinfectant. In 2 cases of missing creamline the fat content was actually satisfactory and the remaining bottle showed a number of dirty greyish abrasions on the outside, possibly derived from the milkman's crate, but the contents were clean and pure.

Dirty bread was an equally frequent cause of complaint, the discoloured patches in 6 of the loaves arising from contact with lubricated machinery at the bakery during the doughing stage; an unsightly but not particularly harmful streaking with iron-stained grease can result. Alternatively, little rolls of burnt bread may drop in from a previous baking and look all too like rodent droppings to the housewife—although droppings were actually found in two complaints. Thorough investigation of the premises showed no further evidence in one case and, in the other, the baker had since gone out of business. Mould was confirmed in two samples, one having been delivered to a school and submitted,

after toasting, with a complaint of staleness. One loaf contained a length of frayed cord and another, baked on "Happy Tuesday", according to the wrapper, a piece of dirty cotton swab baked into the crumb. Animal matter in bread was confined to the major part of one unidentifiable winged insect and one maggot, embedded in the crumb of a piece of bread and butter.

Other cereal products included a highly-decorated iced cake, which had pink flowers, yellow 'cream', white coconut and a heavy growth of green mould in the crumb, and the manufacturers of an iced bun had inadvertently baked into it a long piece of string-like substance, which was actually a bundle of jute fibres, as used to make sacking or coarse twine.

The major part of a pre-packed **chocolate** cake was submitted with the complaint that it did not look sufficiently like the picture on the packet, a familiar feeling among gardeners. Contention centred partly upon the exact shade of brown of the chocolate coating, which had led the purchaser to believe it was milk chocolate, whereas it was actually plain. It was eventually decided that the labellers licence had not quite been exceeded, however, and the gateau was judged genuine.

Two packets of **potato crisps** were received, from differing sources, within a few weeks of each other. They were products of the same manufacturer, of different flavours but almost identical faults. The first one came under the suspicion of containing a large grey slug within the packet, for so it rather revoltingly appeared, but examination showed it to be a fairly large, damp roll of partly-cooked potato starch, oily on the outside from contact with the crisps, which had suffered to the extent of being crisps no longer, but merely rather soggy slices. The second packet was rather worse, in a way, since the lump of half-cooked potato was also mouldy and the odour most unpleasant. The firm blamed faulty machinery at the factory, since replaced.

An unfounded suspicion, as it turned out, related to a small black body, submitted to a Public Health Inspector in a plain envelope by the purchaser who discovered it in a packet of **cornflakes**. It was, in fact, a single charred cornflake.

Rather more justifiable was the claim by a young mother tha a jar of **instant baby food** behaved abnormally upon mixing in the usual way. Tests in the Laboratory showed that the small amount remaining in the jar **did** curdle and separate when mixed with milk according to the directions, instead of forming a smooth cream. It was reported that the proportions of dried egg and orange juice were unusually high in the product and would produce a coagulate in the mix, although the food was wholesome and harmless.

Meat products normally provide a few problems during the year and 17 were the subjects of complaint in 1969. Foreign matter included a small brown beetle in the filling of a meat pasty, a piece of bone from a hamburger, a splinter of wood from a canned ham and a twisted fragment of silvery metal in the contents of a can of Danish pork luncheon meat; this exhibit was reported to be a crumpled piece of tin-plate, printed in various colours and almost certainly part of another can from the same factory . This was acknowledged handsomely by the manufacturers, who stated that "our chief engineer's assumption about the occurrence is that a lid originating from a can opened at the laboratory had inadvertently been dropped into a meat container with raw material ... It has been emphasised in strong terms to the individuals occupied in the laboratory that utmost care

must be taken to avoid recurrencies in future." The individuals occupied in this Laboratory naturally concur.

Another portion of **pasty** was sent in, along with two large fragments of rusted iron, wrapped in newspaper, and alleged to have fallen out of the filling. Any doubt was soon dispelled by a close examination of the mixture of potato cubes, fat and meat remaining in the pastry shell; it had all been liberally sprinkled with rust flakes, distributed throughout the mass. The firm concerned had actually been re-roofing part of the factory at the time and, while they had been careful to prepare no pasties under the scene of operations, it was quite possible that the patter of heavy feet had dislodged bits of old roof about the vital area, they confessed. A wrapped pork pie, on the other hand, was thought to contain part of an insect, but the suspicious little black object embedded in the pastry was only a mass of burnt flour.

Bacteriological spoilage or mould growth are more undesirable features of an ageing pie or sausage and severe criticisms were made concerning a mouldy **chicken and ham pie** and the contamination of the gelatine layer of a **pork pie** with dirty iron-stained grease from factory machinery—for this offence the manufacturers were responsible. Some sausages were criticised for loss of condition; in one case due to blackish-green staining during manufacture and the other to plain old age—a supermarket's rejects had somehow been passed on to a small retailer for sale.

A sample of canned **pork luncheon meat** was thought to have an unpleasantly 'soapy' or 'scenty' flavour, but was in fact the typical poor-quality, not-always-low-priced commercial article, which appears to be constructed, as far as taste and texture go, from pink plastic and pepper. Meat contents nearly always satisfy the standard of 80 per cent, however, and there are a few which actually taste of meat.

The contents of a can of **minced beef loaf** had suffered considerably from an imperfect closure at the factory; when sent in, shortly after opening by the purchaser, the meat was yellowish-grey in colour, with rusty patches, and had an unpleasant putrid odour. The rest of the stock in the shop was quite satisfactory.

No toxic metals were found in a sample of **liver pâté** thought to have caused illness, but the level of lead was high in a single slice of corned beef, examined in connection with family sickness.

Complaints regarding low meat content are rare but welcome, as showing a healthy interest in this fairly important aspect. A new product was advertised on T.V. to contain "chunks of chicken", but the person who bought some was disappointed in this respect and a sample of the savoury paste was examined. The largest chunk in the sample jar was about $^3/_8$ inch long and the majority were only $^1/_8$ inch—about the size of rice grains. While there is no official 'chunk' as a basis for comparison, this was felt to be rather on the small size, and the commercials were eventually modified. Sympathy was all on the side of the purchaser who thought that the contents of a can of **curry with beef and mushrooms** contained very little beef and far too few mushrooms, but the law now, in the form of The Canned Meat Product Regulations, 1967, deliberately excludes mixtures like this from any control as to meat content, so it was only possible to pick out the meat and report a mere 10 per cent per can (excluding a ½ oz. piece of gristle,) record the presence of one or two mushrooms and pass the thing as of no actual danger to health.

Another **meat pie** was analysed because the complainant thought the amount of filling was too small, and it certainly did appear a mere smear inside the puff pastry. However, it consisted entirely of meat and the proportion was equivalent to over 30 per cent of the whole pie, which made it satisfactory under current Regulations.

A child was sick after eating part of a **fish cake**, bought at a fish and chip shop one Saturday evening and rancidity was detected in the fat used to fry it, which could possible have upset the child. The presence of a slight off-taste was confirmed in a piece of **frozen cod** in batter; although with some frozen fish, the presence of any kind of flavour would come as something of a surprise.

Bottled **mussels** constituted another fishy complaint, but this was due only to their fragmented condition and they were of quite wholesome quality. The most unusual sample in this group was a canned Norwegian **fish pudding**, a solid dome-shaped object which should have been snow white but was actually covered with yellow-brown blotches. These were caused by small metallic fragments of tinned iron from the can, and the levels of these two metals were high in the affected portions of pudding. This article was not on general sale, but was supplied by a firm of Scandinavian importers, who also stated that "we are steadily increasing our range of non-food articles, and will shortly even be able to offer Norwegian log cabins—delivered to the buyer's own site"—an interesting idea.

Another slightly improbable submission was the Danish **blue cheese** stated to be mouldy, which might not appear to justify a complaint. However, it can truly be said that mould is where you find it and even more important is the kind of mould you find. Here it was a fairly offensive variety, quite foreign to the normal veined growth, glueing the foil wrapping together and flourishing on the outside of the cheese. A very similar situation arose over a supply of **Camembert cheese** of considerable over-ripeness, but here a question of connoisseurship arises, since one man's cheese may well be another man's poison. A sample of **cottage cheese** was shown to be decidedly non-poisonous, however, and not responsible for an outbreak of sickness.

Salted peanuts were suspected to be the toxic cause of sickness also, in a patient who had consumed rather a lot on his way home from work, but they were quite free from contaminants. Not quite so blameless was the small packet of sonnenblumenkerne, or sunflower seeds, of German origin, given away as a free sample in a health shop. They caused one particular non-purchaser who tried them to experience a burning taste and subsequent sickness; tests in the Laboratory confirmed the unpleasantly acrid flavour and indicated a high degree of rancidity in the oil content of the seeds.

Nothing exceptional or likely to cause illness, was found in samples of tomatoes, oxo cubes, horseradish relish, lime sweets, vegetable soup or menthol and eucalyptus tablets and complaint concerning an instant coffee was, naturally, groundless.

The perils of pickles were illustrated by one black beetle in **tomato ketchup** and over 40 dead maggots found floating in a jar of **pickled walnuts**—they had probably been confined to one rotten walnut in the beginning, but had since become more evenly distributed. Old cans of **mandarin oranges** were failed as unsatisfactory and so were samples of **canned grapefruit**, submitted from three different parts of the County during the year. They were all of the same brand and showed similar signs of corrosive attack

upon the can; the importers were most concerned and had taken a lot of trouble to discover the cause. Apparently, the worst examples of the bad batch had become dark grey in colour, with an offensive sulphurous odour and had given rise to many other complaints over the country. They concluded that the overseas packers had used too much preservative in the sugar and that the tin plate had been a little too thin. They were anxious to recall and destroy all retail stocks, still on the market. One more canned grapefruit came with the familiar old criticism that it was full of white spots, which invariably turn out to be the natural bitter constituent naringin; this does tend to deposit from slightly unripe fruit after a long time in the can. **Canned peas** were found to contain an excess of iron, which had changed the normal green colour to an unattractive yellow-brown, and a **pineapple dessert** was objectionable and unfit for consumption by reason of a heavy growth of black, white and green moulds; the retailer was prosecuted and fined £20. A sample of **blackcurrant wine** was, on the other hand, perfectly pleasant; it had been home-made from a can of blackcurrant purée and the maker afterwards recalled that lacquer lining the can had been very imperfect, but this had produced no ill effect on the wine.

Doubts as to the quality of a **vanilla flavouring** were felt by one purchaser and it did prove to be weaker than the normal commercial article. **Iced lollies** were sent in because a child said they tasted 'bitter', along with other lollies of the same brand for comparison. Analysis showed quite a significantly high salt content in the 'complaint' lollie, about seven times the level in the normal samples, which was undoubtedly the cause of the trouble. The matter was referred to the manufacturers, but appeared to be an isolated incident.

Various **sweets** were sent in by anxious parents during the year. One specimen was covered with a whitish film, the harmless 'bloom' which developes upon chocolate exposed to light or heat, although the little circular 'drops' were actually made of imitation chocolate in this case. They were being sold as "Fairy Drops", however, so no misdescription was involved, the only criticism being of poor storage by the retailer.

Another mother, sounding very indignant, submitted a packet of so-called "sweets", which she described as 'pure rubbish'. They were, indeed, the most highly-coloured confections it is possible to imagine, hard irregular little fragments in a brilliant medley of red, orange, purple, green, yellow, blue, etc. Of these, examined separately, the blue ones turned out to be the most interesting. The basic composition was a harmless mixture of sugar and gum and most of the vivid dyes, however excessive in amount, were permitted by The Colouring Matter Regulations; the exception was a prohibited colour known as Brilliant Blue FCF. This finding led to the submission of further samples of this product by County Inspectors and the eventual report that the blue colour had been replaced by the officially-approved Indigo Carmine.

The last sample led to correspondence with the Home Office, but no really final conclusion. It related to a certain brand of **medicated sweets**, on unrestricted sale to children, which looked just like wrapped toffees, but contained liquorice, linseed, capsicum and a stated 4.2 per cent chloroform. The small child concerned had, in fact, disliked the sweets and said they had a burning taste. The actual content of chloroform was lower than that stated, but a fairly serious view was taken, considering the fact that a pack of 8 sweets could contain many times the maximum dose of chloroform laid down in the

British Pharmacopoeia. The Dunlop Committee on the Safety of Drugs passed the problem to the Home Office, who deal with Poisons Rules and a nice chatty letter confirmed that such sweets were exempt from control, since "no evidence has arisen in the last thirty years to show that these products present any danger to the consumer", and adding "the fact that the child found the sweets unpalatable would seem to offer some safeguard against ingesting an untoward amount of chloroform".

TRADE DESCRIPTIONS ACT

A very wide variety of consumer goods was represented by the 21 samples submitted for analysis under this Act, including cine film, cat food, compost and a carpet.

The **cine film** came from a disappointed photographer, invited to commit a friend's wedding to celluloid, who found that the film returned after development was almost entirely blank, and the happy occasion lost to posterity. A few images were visible on the film, in the region of the splice, which would have been in the centre of the roll before any exposure. It was evident that the original film had been damaged, causing fogging of the outer layers, which could have been due to a long shelf life under bad conditions or to some premature exposure to light, but exactly when this occurred was impossible to say; either the shop or the user could have been at fault.

The sample of **cat food** (Best in Britain for cat or kitten) amply confirmed the complaint that it had a most offensive odour. It was one of those things better judged from the feline than the human angle, however, since the Analyst's own particularly greedy cat eventually ate a portion, after the first surprised recoil. Also, it was prepared from meat, fish and cereal, as claimed—but sympathy still lay with the owner who would have to open the can and suffer the resulting atmosphere.

No pigeons were available to test the **health grit**, claimed in suitably high-flown language to surpass all others, to be indispensable in sickness and in health and to be worth a guinea an ounce. The fact that it was "scientifically medicated with mineral salts" could, it was stated, be demonstrated by "a grain or two placed on the tongue"—human, not pigeon, one assumes. Criticism was actually made of two further statements, that use of the grit "makes medicine unnecessary" and that it was "a grand tonic and bone former". Many types of pigeon ailment would not be affected or improved by eating grit, while the phosphorus content was much too low, in relation to the high amount of calcium, to contribute sufficiently to the formation of bone structures. Omission of both these claims would be made, it was agreed.

Compost was received, with the customer's complaint that it did not consist of the correct John Innes mixture, but examination showed it to be satisfactorily composed of loam, peat and grit with normal levels of fertilising elements. The **carpet** was Indian in origin, with a floral pattern on a white background and had been described on sale as "100% w/pile", which was understood to mean that it was entirely wool, with no synthetic fibres. Careful examination of the 108 square feet of this sample showed only a few non-wool fibres on the surface, not part of the weave and probably acquired by contact with other materials. The main body was a very coarse wool and tufts showed a minimal 97 per cent on analysis, so the carpet was reported satisfactory.

A sample returned as quite unsatisfactory was a non-stick baking tray, one of the kind with 9 cavities for small cakes, stated to be made of "aluminium coated with polytetrafluorethylene, which is absolutely hygienic and tasteless and will make your baking much easier than ever before." "Your buns, cakes, tarts, etc. will flop out of the tin without using a knife", the label continued, and the ware "need not be greased unless you wish". Practical tests were carried out but, far from flopping out of the tin it proved almost impossible to remove the resulting cakes by force and even then, a layer of crumbs remained bonded to the bottom. Microscopic examination of the surface indicated that the anti-stick compound had probably not been sprayed on in sufficient depth, for the surface was still decidedly rough and "sticky".

A scientific **electro-plating kit**, supplied by post at a price in the region of £5, was a badly-packed collection of cheap-looking objects in a shabby cardboard box, but, in point of fact, no fault could be found with the performance as directed in the accompanying leaflet. Suitable objects **could** be plated with a layer of nickel over a film of copper by following the instructions, so a better presentation and pack might have prevented the complaint and still left a considerable profit margin.

Claims were made that the newer pack of a **washing-up liquid** in a plastic bottle had "30% more lather" than the previous pack, so comparative analyses were carried out on the 'before' and 'after' versions. Tests did actually show that the new product contained about 34 per cent more solid detergent than the old, so even allowing for the slightly smaller volume of the new pack, the claim was held to be justified.

A very similar exercise was carried out on a certain brand of **washing powder**, the second pack being labelled "NEW FORMULA for more washday power". Here the analytical differences were much less pronounced, however. There was an increase of fluorescence in the powder, due to the added brightening agent, and a slight rise in the content of alkaline phosphate, but the practical differences on washing tests were quite imperceptible.

Three samples of **aerosol paints**, in patriotic red, white and blue shades, were sent in to check claims that they dried in 7 minutes and, in addition, that the white one (a primer) was non-toxic and could safely be used for painting toys and cots. Paint films of normal thickness were dry within the time limit and the levels of the toxic metals arsenic, lead, cadmium, barium and chromium complied with the standards for paintwork on toys.

Yet another comparative analysis was made on an **aerosol polish**. The older formulation was labelled as "a unique blend of waxes and silicones" and the newer claimed to be "now richer in wax". The word 'wax' **is**, to the chemist, a term which can denote solid fats of animal, vegetable or mineral origin and needs to be much more closely defined. The residue after spraying was certainly more solid in the second case, but both samples gave the same total weight of deposit, amounting to 3.8 per cent of the whole, so it would appear that 'richer in wax' also equates to 'poorer in silicones'.

A different type of improver was the **renovating polish** for shoes which had, in fact, been found to damage the surface of pale shoes made of resin-finished leather. A specimen of this type of leather was also sent in for experimental use; it is said to be more

resistant to dirt and damage than other light-coloured leathers, although the colour may be removed by cleansing fluids such as carbon tetrachloride. The solvent medium in the sample of polish was actually white spirit, but tests showed that it did injure the leather surface all the same. Other commercial brands of shoe polish, furthermore, gave adverse effects also, quite severe in some cases, when the pale surface was partly removed to show the darker leather beneath. It was suggested that warning be given with the renovating polish of its unsuitability for resin-coated leather and that purchasers of such shoes ought to be told what not to use at the time of sale; formulation of a suitable special polish should not be impossible.

A sample of **two-stroke mixture** for motor cycles was analysed, following a suspicion that the necessary oil component had been omitted, causing an engine to seize up. A sample known to be genuine was also sent in, as a reference standard; both samples were found to contain oil in the correct proportion of 1 part to 20–25 parts of petrol and were reported satisfactory.

From a more feminine sphere, a complaint was received concerning **mascara**, alleged on the carton to be "Truly waterproof"; this was disputed by the purchaser. The sample consisted of a dark brown pigment suspended in an oily base and, as such, was water-repellant. Mere tears would not wash it from the lashes (although scrubbing with a handkerchief would) and it was therefore passed as genuine.

A question of colour removal was the reason for submitting another sample, which also illustrates the fact that a description is essential before any action can be taken under the Trade Descriptions Act. In this case a **toy telephone** had been bought in a supermarket and found to stain a childs shirt with patches of red dye. There was no manufacturers label apart from the words "Made in Hong Kong" stamped on the base, and certainly no claims to be colour-fast. Self-selection from the shelves and the slow queue to pay at the supermarket exit to not involve any verbal passages re merchandise, so, without a description, there can be no redress on some goods. In this case, the toy could be taken for examination under The Toys (Safety) Regulations, 1967, although here the main concern is the possible risk to the child's health, with no reference to the mother's laundry problems. The telephone was made of red plastic and colour could be removed by rubbing with a damp cloth; the dye was not one approved for safe use in foodstuffs in this country and it was advised that the toy was not satisfactory. The Chief Inspector reported that the retailers were aware of the problem and that they had intended to withdraw all such toys from sale earlier in the year.

A further 7 toys were received in December, also in connection with the above Regulations, made under the Consumer Protection Act. They consisted of 2 humming tops, 1 spinning top, 1 travelling car, 1 counting toy, 1 box of watercolours and a 'circus clown with revolving balloon' and came from West Germany, China, Japan and England. Most had brightly painted metal or wooden bodies and the film of paint was scraped off and analysed for toxic metals. All toys were passed as satisfactory, although one of the humming tops had 4,900 parts per million lead in its paint-work and the present Regulation limit is 5,000 parts.

PHARMACY AND POISONS ACT

Only one sample was received for analysis under the above Act, and that was a **weedkiller**, shown to contain 5.0 per cent paraquat. Preparations in pellet form (as this was) containing not more than 5 per cent paraquat equivalent are exempted from control by amendments to the Poisons and Therapeutic Substances List.

FERTILISERS AND FEEDING STUFFS

Each year the Ministry of Agriculture, Fisheries and Food issues a summary of the administration of the above Act, based on the quarterly returns made by all the local authorities concerned—one is glad to note that some use is made of all the facts painstakingly entered on the Ministry's enormous forms. In the last available summary, for 1968, Somerset County Council is fifth in the list of total samples, but holds a clear lead in the number of formal samples taken. This is reasonably creditable when it is considered that the returns come from 58 counties, 85 county boroughs and 32 London boroughs, although the Ministry are careful to stress that these vary very much in size and type. It is not surprising, for instance, that the London boroughs tend to be bottom of this particular league.

In all, 236 samples were analysed, mainly submitted formally, and consisted of 183 feeding stuffs (12 unsatisfactory) and 53 fertilisers (5 unsatisfactory). A further 10 feeds and 8 fertilisers were judged merely incorrect since, although the composition differed slightly from the statement given, the differences were not prejudicial.

Urea present in feeds as protein supplement without due disclosure was regarded as prejudicial, more especially when one was described as **"Dairy Cake without Urea"**. Deficiency of protein is certainly not desirable, either, and low protein in **Dairy Nuts** led to a prosecution, low protein was also reported in **Crown Nuts**, low protein and low oil in a **Coarse Dairy Ration**.

There are other feeds in which a high oil is a disadvantage, however, and a written caution was sent by the Chief Inspector to the manufacturers of a sample of **Pig Rearing Pencils**, for this reason.

Too great a proportion of fibre was the fault in two other unsatisfactory feeds, one a **Pig Breeders Concentrate** and the other a **Growers Mash**.

The position of copper in feeding stuffs, legally speaking, is that amounts of less than 70 parts per million need not be declared at all (although the natural amount is much less than this) and limits are applied to the declared figure according to whether it is above or below 200 parts per million; the maximum amount in any general feed should not exceed 250 parts per million, although this is not stated in the Regulations. Danger from copper lies more in excess than deficiency, so most low copper analyses are passed as being outside the limits but not prejudicial. In one instance, however, the stated proportion was 120 parts per million added copper but the **Pig Fattening Meal** contained a mere 26 parts per million, which is an average natural level, and the criticism was more severe, since it was probable that no addition had taken place at all.

A confused set of claims was made for an **Intensive Growers (VA)(ACS) Meal**, the initials normally being taken to mean "Vitamins Added" and "Anti-Coccidiosis Supplement" in this type of poultry feed. The chemicals added as coccidiostats were stated to be:-

41 p.p.m. Amprolium
30 p.p.m. Sulphadinidine
3 p.p.m. Ethopabate

The middle compound of this set is invariably Sulphaquinoxaline, not the slightly misspelt sulphadimidine, but in any event, not one of the possibilities was present.

The below-par fertilisers numbered five, three of which were low in phosphoric acid; they were a **Bone Meal**, an **Organic Liquid Fertiliser** and a **Proprietary Fertiliser**, all as informal samples. A considerable deficiency of potash was found in a **Rose Fertiliser**, also sampled informally and this information was passed to the authority for the area of manufacture.

Growmore Fertiliser was the type which gave the most trouble during the year. Minor discrepancies were reported for four samples and the potash found to be too low in a formal sample. The compound is usually formulated to give total amounts of 7% nitrogen, 7% phosphoric acid and 7% potash; by the Regulation method, using a flame photometer, the estimation of potash indicated only 4.8 per cent. It has been observed, however, that this method does tend to give results rather lower than the true figure in certain cases, unless a preliminary acid treatment is used; on this occasion the real answer was believed to be 6.2 per cent, still fractionally outside the applied limit, but much nearer to the statement.

It was hoped that a modification of the method might be made in the Amending Regulations, to put this anomalous matter right, but the Ministry have not taken this step, having their energies rather centred upon the forthcoming new Agriculture Act.

It is not yet required that the smaller packs of fertilisers bear quantitative particulars of the additives they contain; this comes into force on 1st October, 1970. Meanwhile some firms are making voluntary claims in profusion, like the concentrated plant food which listed amounts of iron, magnesium, manganese, copper, cobalt, boron, molybdenum and zinc, all of which had to be determined.

Estimation of the main extra ingredients in the farm rations at present is becoming a large area of work and needs many more man-hours than it used to do. Compounds actually determined in feeds, as opposed to the simple yes-no-test for their presence, included antibiotics, arsenicals, anti-blackhead drugs (in turkey foods), coccidiostats, copper salts, furazolidone, urea, salt and magnesium oxide. The total number of such additive results for both feeding stuffs and fertilisers was 133, representing a lot of extra work.

WATERS AND SEWAGES

This necessary service of analysis is carried out for the benefit of other local authorities in the county, and most of the 36 Councils do take advantage of a regular check on the efficiency of their sewage works or the character of their drinking water. The total number of samples again showed a slight increase, to the figure of 733, the majority being sewage effluents, but some being samples taken at various stages of treatment, from the incoming crude sewage onwards, together with some of the trade wastes accepted into the system and a few river waters, to measure the effect of discharge.

In addition, 139 special samples for limited or special analysis were submitted, with pollution the main problem and theme common to almost all of them. The Laboratory keeps an official eye upon the purity of the numerous school swimming pools, thanks to samples supplied by the County Health Inspector, and tests for adequate chlorination and general condition were made on 56 waters, not only from the larger places like Bridgwater, Burnham, Clevedon and Glastonbury, but also from Porlock, Exford, High Ham, Huish Episcopi, North Curry, Queen Camel and many other schools—about 30 in all.

The County Health Inspector also sent in some reclaimed dairy wastes and, more unusually, a series of waters from the underground pools and rivers of the Mendip caves. Pollution by potholers was the possibility, but analyses showed water from Swildon's Hole, Gortchurch Cavern and Rod's Pot to be pure and clean, in the main, or, rather, before the main, since it is later used by the Bristol Waterworks Company.

Another Water Board suspected some contamination of its supply by diesel oil, used as the vehicle of a spray in the catchment area, but findings amounted to less than one-tenth part per million and, for all practical purposes, were therefore negative. Various fish-ponds, streams and ornamental pools were investigated for pollution; one pool had been stocked with trout which had apparently disappeared without trace and analysis showed a decided pollution by domestic sewage, confirmed by the presence of synthetic detergent. Since trout are sensitive fish, this probably accounted for their loss. Fish also failed to thrive in a school pool and the minute traces of lead and copper present in a sample of the water could possibly have had an adverse effect over a long period. Nothing could be found in a farmer's stream water, or in the effluent from the nearby sewage works, to account for the death of a cow, however. Other jobs included testing sea water from the Museum tanks and storm water from an Army camp.

Sewage works themselves were the source of a number of problems. A black viscous mass clogging up the tanks at one works, thought to be tar from road works was shown in the Laboratory to be a heavy fuel oil, known in the trade as '200 sec', and confirmed by the infra-red spectrum of a known sample. With this clue, the blame was found to lie in a certain local factory workshop which had suffered from a burst fuel pipe. A heavy concentration of dairy waste was thought to be the cause of trouble of another works; straw and fat were determined in the sludge from one source and a very complex trade waste from a paperworks examined. This latter effluent from the paper mill was stated to contain wood pulp fibres (of course), but also 'loaders' of titanium oxide and china clay, formaldehyde resin to give wet strength, glue size and starch for non-absorbent surfaces, sodium hydroxide used in boiling hemp and, if paper for cheques was being

manufactured, a further mixture of compounds including cyanides. Samples of sludge from the white and the green tanks, so called, were analysed for water content, organic matter and calorific value.

The pumping chambers to the septic tanks of a village sewerage system were becoming filled with a heavy whitish deposit, found on analysis to be very high in calcium carbonate. This can occur as the result of putting in new concrete structures, the calcium being first washed out by a slightly acidic flow and then precipitated as the medium becomes alkaline.

A recently-completed sewage works was having considerable teething troubles, mainly with excessive foaming due to detergent. This was not being removed by the new system, which takes some time to settle down to efficient working, so checks were made and advice given, to allay the froth on the nearby stream.

A stream in the north of the County, flowing through a village on the road to Bath, was horribly polluted by an evil-smelling brown slime. Laboratory examination showed it to be an exceptionally healthy growth of sulphur bacteria, which can reduce the natural—and odourless—sulphates in a water-course to highly offensive sulphides. They can occasionally arise in unpolluted streams, but here there did seem to be an indication of sewage gaining access. The Public Health Inspector had tried the usual method of tracing possible sources, by putting a fluorescent chemical down and seeing if it re-emerged in the stream, but without success. Laboratory tests did show, however, that in conditions of slight acidity and attack by sulphide, the fluorescent colour would be destroyed en route in any event. The school situated just above a spring head was slightly suspect, since this water later joined the main stream, and only below this point was pollution really evident. While the mystery was still unsolved, the weather broke and a fine flush of summer rain fortunately cleared the course of the stream; the trouble has not since recurred.

For drinking waters, the most important problem was contamination by metals, with lead the least desirable one. One Rural Council in mid-county sent in two waters, known to be drawn from old lead service pipes. One was a well water, and the first draw-off from the pump had 0.4 part per million lead, a considerable excess when the maximum level should be only 0.05 part per million. The second was submitted both as the first draw-off and as a sample taken later in the day, following normal usage; the level of 0.15 part per million lead after the overnight action had dropped to nil after usage. At the request of the Medical Officer, a further 18 samples of drinking water were examined, taken from farms and houses known to have lead delivery pipes; 13 were found to be free from lead, even on the first draw-off and one contained a trace at first, falling to nil later in the day. Lead in the supply to one farmhouse fell from 0.09 to 0.04 part per million during the day but, on the final premises where the supply was sampled, the lead content started at 0.24 part and dropped only to 0.11 part per million a few hours later. As a footnote, it must be recorded that the ancient gentleman inhabiting the premises resisted any suggestion that his supply was in the least unwholesome.

A number of householders did bring in specimens of drinking water which caused them concern, however, and the reason was often the presence of a brown turbidity, mainly due to iron salts. This can occur when an unusually heavy demand stirs up the deposit in dead-ends of water-mains, and flushing-out, with pumping to waste,

generally clears the trouble. One tomato grower found that the irrigation system watering his greenhouses had come to a halt, during one of the hotter summer months, choked with sediment from the stream-water used. Examination showed this to be an entirely natural growth, a sudden boom in the birth-rate of organisms and algae due to the warm conditions and low flow rate. A filtration device was suggested, as a temporary measure.

Many other drinking waters were given a full chemical check for occupiers; one dweller in a fairly remote rural spot, served by his own spring, had recently changed the old iron plumbing for a complete new copper hot-water system, and been troubled by blue bath-water ever since. A sample taken from the spring for analysis showed it to be extremely acidic, very soft and highly aggressive to copper piping. Advice was given on a mini-form of treatment to reduce the ill effects.

Pre-testing is often a wise precaution and some well water sent with an enquiry as to its suitability for use in a steam-boiler could be condemned without actually wasting a steam-boiler to prove its extreme unsuitability. Soft, acidic, high in chlorides and carbon dioxide, its predictable solvent action upon metals was also shown by the traces of iron, copper and zinc already present.

PESTICIDE RESIDUE ANALYSIS

The routine testing of random foodstuffs was carried on throughout the year and 236 were examined. Of these 66.1 per cent were entirely negative and 17.4 per cent contained minute, but detectable traces of pesticides. The remaining 16.5 per cent are listed below.

PESTICIDE TRACES (parts per million)

Food	D.D.T.	D.D.E.	T.D.E.	B.H.C.
Apples	0.18	0.06	—	—
Apples	0.10	0.04	—	0.06
Apples	0.15	0.08	—	—
Apples	—	0.53	—	—
Baby Food (Milk)	0.06	0.08	—	—
Baby Food (Milk)	0.07	0.05	—	—
Butter	0.10	0.30	—	0.05
Cabbage	0.14	—	—	0.10
Cake	0.10	0.15	—	—
Carrots	0.90	0.10	0.20	—
Carrots	0.65	0.20	—	—
Carrots	0.06	0.08	—	—
Chicken	—	0.14	—	0.05
Cucumber	0.04	0.07	—	—
Cucumber	—	0.12	—	—
Cucumber	0.12	0.09	—	—
Cucumber	—	—	—	0.12
Dripping	0.05	0.08	—	—
Dripping	0.04	0.32	—	—

Food	D.D.T.	D.D.E.	T.D.E.	B.H.C.
Dripping	0.07	0.84	—	—
Dripping	0.05	0.32	—	—
Dripping	0.04	0.14	—	0.02
Dripping	—	0.72	—	—
Grapes	0.10	0.08	—	—
Grapes	—	—	—	0.16
Lard	0.08	0.05	—	—
Lard	0.05	0.07	—	—
Lard	0.03	0.08	0.06	—
Lard	—	0.18	—	—
Lettuce	—	0.16	—	—
Lettuce	0.30	0.25	—	—
Lettuce	0.09	0.04	—	—
Pears	—	—	—	0.11
Pudding	0.09	0.07	—	—
Sausages, Pork	0.10	0.06	0.04	0.03
Sausages, Beef	0.08	0.07	0.05	0.04
Sausages, Beef	0.03	0.09	—	—
Tea	0.08	0.22	—	—
Tea	0.07	0.04	—	—

None of the total amounts could really be regarded as cause for concern in itself, although it is obviously a very wise precaution to keep a careful eye upon these indications of past and present treatment.

A further 135 samples were examined by gas chromatograph, mainly monitored trade wastes and effluents. The waste from a certain works is tested every week; traces of D.D.T. and D.D.E were reported present on thirteen weekly samples from the first half of the year, with the occasional presence of T.D.E. or B.H.C., but only 3 positive samples were recorded in the last six months of 1969, and then only minute amounts of B.H.C were detected. It is always interesting to note that traces in the waste almost always re-appear, at a much diluted level, in the effluent from the local sewage works, also checked each week; on only two occasions during the year did the total pesticide level in the effluent exceed 0.001 part per million.

A number of samples were also examined for the Cornwall, Devon and Somerset River Authorities, mainly in relation to the well-being of fish life.

Dead trout were received in July, with a sample of a fungicide containing quintozene (pentrachloro-nitrobenzene) as its active constituent, suspected as a possible cause of sudden death, but no quintozene could be detected in the tissues. Results were more rewarding in a similar case: a proprietary herbicide containing salts of dichlorprop and MCPA had been used to control weed-growth on a river bank and fish death had been reported soon afterwards. A large slice was cut from the middle of the dead fish to extract and test, although here nobody could be said to get the Best, since it was in an

advanced state of decomposition. Nevertheless, examination by Thin Layer Chromatography showed very small but quite definite amounts of both active compounds from the herbicide.

Neither the stomach contents of a dead pig nor a sample of its feed, in the form of Growers Pellets, showed any dieldrin to be present, however, as the veterinary surgeon had suspected. Tests were carried out, at the request of an urban district suffering from a plague of flies at the main refuse tip, on the use of an organo-phosphorus pesticide spray and practical experiments confirmed that it was efficient at the suggested low concentration.

Exceedingly minute traces of BHC detected in 3 samples of water from a reservoir and no pesticides at all were present in a sample of sludge from a sewage works.

CLASSIFIED LIST OF FOODS TESTED FOR PESTICIDES

Food	Positive	Trace	Negative
Apples	4	2	5
Baby Food (Milk)	3	—	9
Bacon	1	1	8
Butter	3	1	4
Cabbage	2	—	5
Cakes and Puddings	2	2	4
Carrots	4	2	10
Chicken	2	1	5
Cooking Fat	3	—	4
Cucumber	4	—	3
Dried Fruit etc.	1	1	7
Dripping	6	—	2
Eggs	1	—	7
Grapes	2	1	7
Lard	5	1	2
Lettuce	7	1	6
Meats (canned)	1	—	6
Milk	1	—	15
Milk Powder	—	—	2
Mushrooms	3	1	5
Oats	—	—	8
Pears	1	—	8
Potatoes	—	—	1
Rice	—	1	7
Sausages	3	—	10
Strawberries	—	4	1
Tea	1	1	4
Tomatoes	—	—	1
TOTALS	60	20	156

MISCELLANEOUS SAMPLES

This all-purpose category seems to expand every year and the total number of 1,763 samples shows a 30 per cent rise on last year's figure.

Antibiotics, pesticides and waters have already been mentioned in their sections, so this last analysis means 357 samples of great variety. Sherlock Holmes may be able to say, in The Sign of Four, "I gave my mind a thorough rest by plunging into a chemical analysis", but this is, sadly, not the case today. It is interesting to speculate if Sherlock would have made a good Public Analyst; morphine addiction is probably not of very much assistance and one is quite certainly better off without violin-playing. All the unrecorded work such as verbal advice must also include a good deal of hard thinking about other people's problems, ranging from the simple what-is-it? (which may have a rather complex answer) to the much more difficult how-can-I-remove or prevent or compensate in future? (It is safe to assume that most incidents relate to undesirable objects.) These may be smuts in the car park, water in the gin, herbicide in the river, salt in the hen food or fuel oil in the drains. Many of them are matters of translocation or presence in the wrong places; water in the river is alright, for instance, although hardly herbicide in the gin.

One important phase of the Laboratory's work had to do with the element arsenic, which is fairly unwelcome anywhere. Indeed, a set of Regulations exists to limit its presence in foodstuffs to a minute trace, the general maximum being only 1 part per million. Above this level, the food is legally unfit for consumption.

Two classes of food are at special natural risk in this context—shellfish and offal—and for oddly similar reasons. Oysters, mussels etc. are known to concentrate within their bodies the traces of metals found in the impure waters round our coasts, and the liver of the vertebrate animals is the organ which de-toxicates the blood by removing, and accumulating in some cases, metals derived from the diet. These forms of build-up can give high eventual proportions.

At present, animal feeding stuffs are subjected, by the demands of factory farming, to increasing degrees of medication. Some are controlled by the Feeding Stuff Regulations, but many are quite outside this official defence, which is riddled with loopholes. There is nothing to prevent pig keepers or other farmers from adding whatever high-powered drugs they choose, in the form of combined disease-preventers and growth-promoters; many of these compounds contain arsenic. It was decided to carry out a survey after two incidents in separate parts of the county affecting pigs sent for slaughter after very recent recovery from illness, during which they had been given extra doses of arsenicals. Rapid tests on 5 livers from the first lot showed them to contain more than 5 parts per million of arsenic and a determination on a single sample from the second incident gave a figure of 6.5 parts per million, quite sufficient to show cause for concern.

Since many troughs also contain generous helpings of copper salts, which are sometimes fed from weaning to slaughter, it was decided, initially, to examine samples of liver on retail sale in the county, to be submitted by the Chief Inspector of Weights and Measures, for arsenic, copper and lead. A total of 125 samples, (104 from pigs) was analysed, and arsenic in excess of 1 part per million was found in 5 of them, all pigs livers.

Further samples, sent in by request from the slaughterhouses of 4 or 5 local authorities in the county, showed that the incidence of arsenic among casualty pigs was much higher. One batch of 3 livers produced the results 2.0, 13.0 and 30.0 parts per million arsenic on the wet liver, as received—and as sold for consumption.

The metal copper presents a slightly different legal angle, since the Ministry decided in 1958 that no statutory control was necessary, and merely published recommended limits. Special mention was made of the fact that shellfish, crustacea and offals could contain high natural amounts and it was suggested that the general limit of 20 parts per million copper "should be permitted if it can be shown that the copper is of natural occurrence." (How such a demonstration could be achieved was not even hinted.)

This leaves the analyst in somewhat of a quandry when 38 of the 125 samples have a copper content exceeding the recommended proportion, some by a very great margin. An arbitrary line was therefore drawn at the level of 50 parts per million, since amounts in this region certainly appear unnatural; the highest figure recorded in the Laboratory's first project was 185 parts per million copper. (In 1970, the record rises to 280 parts). Amounts of this order are most certainly undesirable in any foodstuff.

The Ministry of Agriculture, Fisheries and Food, in a letter of June 1969, consider that the existing controls are adequate, and hope that they will have a deterrent effect. The Medicines Act, 1968 is full of possibilities for a more effective set-up to license the medication of feeds, but these are admittedly in the distant future, and meanwhile an Act without teeth makes a poor impression, dental or otherwise. Strong adverse publicity seems more of a present protection; further facts are being accumulated.

A new policy was adopted towards **School Meals** samples, which should result in much more efficient control of foodstuff quality in future, if all goes well. The successful firms obtaining contracts submitted their commodities for fuller analysis, which must provide the essential objective background for practical cooking tests.

Some of the foods did, in fact, receive an adverse report, for lack of iron in flour, carbon dioxide in baking powder or fruit in jam, and others were found to be of poor quality. Further samples were submitted in some cases and, in addition, were taken in school kitchens by Weights and Measures Inspectors on various occasions, as a check on compliance with a consistent standard. The Laboratory received 118 samples in all; including complaints of detergent causing rashes, flour producing hard, heavy sponge cakes and spoons becoming rusty when washed by normal methods.

The year opened with two samples of **spirits** from a private purchaser on New Year's Day; both were intended to be 70° Proof, but the gin was only 50.1° Proof and the whisky a mere 21.9° Proof, indicating **dilution** with over two volumes of water. An **alcoholic product** of local manufacture was much more satisfactory when examined in connection with an export order to the Philippines, which required a "Government-approved Certificate", and many letters passed to and fro regarding similar documentation for sending **cheese** to Japan. This certificate had to confirm that the consignment was 'natural cheese', since the penalty for supplying processed cheese could be imprisonment of the importer, and the Board of Trade suggested the inclusion of the slightly odd Japanese definition of natural cheese. This was, in the **third** version of the certificate, removed at the particular request of the British Embassy at Tokyo. The firm's director

commented feelingly that he would willingly vacate his desk to any Minister who claimed that exporting was fun.

Contrariwise, imports of **tomato paste** from Portugal were checked at the Somerset port of entry on behalf of the authority, for a satisfactorily high solids and low metals content. Only one of the 14 samples contained any metal in excess of the normal limits, but that had too much copper and the firm of importers was notified. Copper was also the cause of complaint, along with iron, when a side of **bacon** from Ireland was found at a meat factory to have bright green rind, although the underlying fat was normal. Removal of the rind seemed the obvious course to take. Contact with very old machinery on the farm processing its own **cream** led to some degree of suspicion about the pick-up of metals, but 6 samples of single and double creams, from this source showed only negligible contents of iron, tin, copper, lead and zinc.

A batch of foreign **lemon juice** was tested for preservative in London, and the finding of excess sulphite reported to a Public Health Inspector in Somerset. He took samples of the juice at the factory of the importing firm and also of the meat paste in which it was used, but after processing it was found to be free from sulphite.

One firm was not satisfied with the keeping quality of the wrapped **cakes** it sold and two were submitted for analysis. Baked on the 9th July, they were received and examined over 2 weeks later, when a heavy brown mould growth extended over the sides and penetrated the crumb. The fact that it flourished inside an intact wrapper indicated contamination in the bakery before packing, with growth fostered by poor storage conditions.

Iced lollies depend on a low temperature and a high acidity for their preservation, so two were checked for pH, values of 2.7 showing a satisfactory acid content; 5 **milks** were analysed for fat and solids on behalf of their producers.

A large box of **chocolates** was more in the Sherlock Holmes line, but very careful inspection showed no traces of the suspected tampering and they were eventually tested in the most direct fashion, by consumption with no ill effects. An accompanying yellow powder was also drug-free.

Some twigs bearing leaves and yellowish berries were sent in with a query as to their possible use for wine-making. The lady making the enquiry knew that similar berries were used for making jam in Russia and sauce in France. Information from the Long Ashton Research Station confirmed that the plant was the sea buck-thorn and that quite palatable wine could indeed be achieved from the berries, which were made into medicinal syrup in Germany, being rich in vitamin C, so it was obviously a clear case of passing the buck-thorn.

Examination of feeding stuffs in connection with suspected ailments of cattle, pigs or poultry is often an unrewarding business, when a great deal of compositional analysis will yield no real clue to the drop in milk/egg production, or the apparent "off-colour" condition of prize stock. One cattle cake showed no deleterious ingredients at all, but a poultry meal proved to contain excessive salt; the hens had certainly been seen to drink more than usual, as part of their symptoms. The normal salt level in the meal is of the order of 0.5 per cent, but this one had 1.7 per cent. One farmer had inherited a stock

of iron injection for piglets from a previous occupier, but did not trust it over-much. However, analysis showed it to have a satisfactory amount of active iron, in spite of its age.

A trace of fluorine in the drinking water is immensely beneficial in helping to form strong teeth in children, but much larger amounts, deposited on pastures as industrial waste products, can cause fluorosis in cattle, detected by the excretion of fluorine in the urine long before other symptoms are visible; 8 specimens of bovine urine were analysed for a veterinary surgeon in this connection.

Some hens which were past veterinary aid a long time before submission were tested for strychnine, but the somewhat ancient carcases yielded no trace. Other dead fowls included two birds which had dropped dead on a Borough rubbish tip, for no apparent reason, and a bright yellow herring gull, from an enthusiastic bird-watcher who suggested that it be mounted in the Museum after the cause of death—?agricultural chemicals?—was established. A mixture of oil and iron formed the main stain on the feathers, but the interior was free from insecticide, and death due to a neck wound, possibly from wire, as suspected.

Bits of dead moths from a school kitchen were in such a fragmented state on arrival that the most determined efforts at jig-saw reconstruction could not produce enough to identify, but flies from a council estate were thought to be catabomba pyrastri, or the black-and-yellow hover fly.

On the same estate, the U.D.C. Surveyor had suspected that the painting contractor had not been applying the correct number of paint coats to the woodwork, as specified. Reports on a number of paint flakes from the site, sampled last year, did show that, in part, only 3 paint layers were present, and not the required 4 coats. More work was carried out this year, in an interesting collaboration with the firm's research and development department, and the findings were in very close agreement. Theoretically the thickness of 2 undercoats and 1 gloss coat of paint, on top of the necessary primer, should lie between 69 and 101 microns (1 micron being in the order of 0.000039 inch) Measurements showed thicknesses were less than the desirable limit in about half the samples examined, being only half the amount in some cases. The firm maintained, however, that it was impossible to count the number of undercoats under the microscope, especially if the first coat was still wet when the second was applied, a common practice among painters. Six test pieces of painted wood were supplied, two of which were short of one undercoat layer, and it proved perfectly possible to pick out the offending pair by using a microscope, on sections cut through the entire film. The original findings were then accepted as correct.

The paint on a cot was analysed for an entirely different reason, since the child's father wanted to be sure that it did not contain too much lead; the level in the very small flake submitted was around 0.2 per cent. Since this is well below the limit of 0.5 per cent fixed for the paint on chewable toys, it was thought to be satisfactory. A sample of wallpaper was subjected to various tests, following the complaint that it had given off a strong acrid smell while being pasted and the amateur hanger had suffered from a sore throat ever since, he possibly had in mind the classic cases of arsenical poisoning due to wallpaper coloured with copper arsenite or Scheele's Green, which were recorded a century ago in this country, and much more recently in Rome, but, in this case, no such toxic material was detected.

Much more severe criticism was given to samples of foam rubber pieces, bought at a market stall. The purchaser took them to the Medical Officer since she thought they had an offensive odour, and this was amply confirmed in the Laboratory. Strong-smelling volatile constituents made the foam rubber highly unsuitable for stuffing cushions, etc., it was suggested that these products arose from the final treatment during manufacture, and should certainly be removed before sale as waste. The actual manufacturers of the flame-proofed poly-ether foam were most co-operative and told the Public Health Inspector that the raw material was bought by another firm, who made it into foam tubing by cutting it with hot wires. The resultant scrap, which had its original aroma considerably heightened by this heat treatment, was put through a crumbing machine and reduced to small pieces, some of which were eventually sold in the local market. The past tense is now quite correct, since the scrap material is now to be utilised within the factory in some other way.

Shirt collars were submitted by another manufacturing firm, worried because their product did not remain snow white after starching, but developed unsightly brown patches in the front corners. The water supply to the premises and the dry starch powder were examined, as well as the collars themselves, and the trouble traced to the presence of minute particles of iron in the starch, trapped between the two surfaces of the collar and collecting in the corners; a change of starch or supplier thereof was indicated.

An iron deposit on a larger scale did, in fact consist of a larger scale. It came from the heating system in the newest block of County Hall and was fairly characteristic of the normal slight debris in a new cast iron or steel pipe, generally removed mechanically by the first passage of water, it can be a nuisance if it accumulates but is not evidence of corrosion. Considerable corrosion was shown in sections of copper piping submitted from the Architect's Department. A heavy blue-grey incrustation had built up on the inside of the pipe, which contained a significant amount of zinc, as well as copper, and, underneath this deposit, "pin-holing" attack on the inner surface was quite severe. The pipe had been replaced, but already slight signs of corrosion were observable in the new piping. The attack seemed to be triggered by minute particles of zinc, possible derived from the galvanised roof tank, and samples of water did confirm this. The supply from the rising main was quite free from zinc and copper, but water from the roof tank had a total zinc content of over 7 parts per million, mainly as insoluble matter. The normal limit for a drinking water is 5 parts per million.

Material from a house in the same area was sent to see if analysis could help to establish the presence of a damp course in the old premises. The material contained a high proportion of bitumen, which seemed to show that a damp course was probable. A sample of putty was examined for possible additives and, within the Department, a child's rattle of highly-coloured plastic, used in hearing tests, was analysed for any toxic metals. Comparisons were made on three different types of plastic covers for swimming pools; those with a reinforcing mesh sandwiched between films of plastic were much tougher and more resistant to damage. Another plastic problem was the examination of a moulding, which formed part of a fuel pump in the County Hall heating system; the Engineer wanted to check that a rubber fitting had not been supplied in error, but tests showed it was indeed a plastic material, of the polybutadiene type. A white powder used to seal glass fibre insulation was found to be a salt of lead and boron.

Various dusts and powders included smuts from a hospital chimney, and the fine sand deposited by flood water in a village street; the occupier of a nearby cottage was concerned to know if any polluting organic matter, such as pig manure, was present, but analysis showed it to be unusually clean. A film of light brown dust was continually forming on cars displayed for sale at a relatively rural garage, and a nearby feeding-stuff firm was suspected of originating this nuisance. Microscopic examination of the dust showed it to be mineral, not vegetable, however, resembling road dust or possibly the soil being dumped on a neighbouring tip.

The remaining samples are entirely soils, stones, sludges, silage, sewage, stream water and sheep dip, analysed respectively for horticultural needs, sulphate content, fats and straw, protein and fibre, detergent and the 2. chloro (2.4 dichlorophenyl) vinyl diethyl ester of phosphoric acid.

BOROUGH OF WESTON–SUPER–MARE

A total of 151 samples was submitted during 1969 by the Chief Public Health Inspector, of which 3 were formal, 146 informal and 2 private samples; both private samples and 8 others were reported to be unsatisfactory.

A certain batch of **Canned Grapefruit** has already been mentioned in this Report as arousing complaints from members of the public on 3 separate occasions during the year (and a further one early in 1970). Severe attack on the cans was obvious in the 2 samples coming from Weston and they were in an unsaleable condition.

Signs advertising "Fresh Milk" were displayed in a snack bar, but a sample representing two glasses of **Milk** sold on the premises was not only already souring when received, but consisted of skimmed milk, possibly even reconstituted from powder. The proprietors were warned to describe their drinks correctly in future.

A **Cream of Chicken Soup** was stated on the label of the can to be made from "Fresh Milk, Chickens, Flour, Chicken-fat, Celery, Salt, Sugar, Onions, Seasoning Salt (sodium glutamate), Vegetable extract, Spices and Herbs", but the total fat content was only 2.1 per cent, and only half of this was butter-fat. A somewhat complicated Code of Practice, originally agreed in 1949 and revised in 1965, governs the standard of fat in cream soups. If the total fat is more than 3.5 per cent, then no butter need be present; for a total fat between 3.5 and 3.0 per cent then the butter fat must lie between 2.5 and 1.5 per cent. When the total fat is as low as 2.5 per cent, it must all be butter. In the present case, the sample conformed with none of these standards, but a further informal sample of the same product was received a month later, with a new label and a more satisfactory composition.

A sample of **Picnic Pork**, canned in Denmark, was found to be slightly low in meat content. Now required to contain 95 per cent meat, it had only 89.6 per cent, and the importers were most concerned, since they stated that the ingoing meat should be rigidly controlled to a minimal 95 per cent. A small labelling error was also reported for a can of **Cornish Pasty Filling**, in which the actual meat used was not specified; the firm had already been made aware of the mistake and regretted that a few old cans were still in circulation.

A vegetarian product, in the shape of a solid grey-brown cylindrical roll entitled **Nut Meat Galantine** was more severely criticised. The label on the can gave the list of ingredients as "Rusk, Almond or Cashew Nut Kernels, as available, Ground nuts, Yeast extract, Wheat starch, Rice or Rye Flours as available, Wheat Gluten if available, Agar-agar Potato Flour, Vegetable and Herb Flavouring, Salt and Spices". There seemed far too many elements of doubt in this somewhat unappetising list, for one thing, and the conspicuous use of the word 'Meat' in the main description appeared undesirable, when no animal flesh was present. The expression 'nut meats', for the shelled kernels, is better known in the United States than over here. The product was further described as a "Ready-to-eat Protein Food", but contained only 6.6 per cent protein, which is less than that in flour, and only about a third of the amount in raw steak or cheese. The retail shop concerned had no further stock of this slow-moving commodity, however, and the manufacturers confirmed that the line had ceased some five years previously, adding "we apologise for any inconvenience . . . but are at a loss to understand why this Galantine should still be on sale".

The other three samples all suffered from labelling faults or omissions; one was a particularly fierce condiment stated to be a blend of red peppers, oregano, cumin, cayenne and garlic powder, with the necessary advice to "use cautiously" (reminding one of the small item of foreign apparatus which arrived at the Laboratory labelled "DO NOT EAT"). The sample was described as "the characteristic spice mixture of Mexican cookery used in dishes such as Chili con carne and Guacamole" – if anyone is interested, Guacamole is made from pulped avocado pear with sour cream, lemon juice, onion juice and seasoning.

The only objection was to the name of this highly-flavoured article, which was **Chili Powder**, a description which applies in this country solely to ground red chillies, which are really capsicum fruits, and very hot indeed, as Becky Sharp discovered.

A very large jar of **Concentrated Mint Sauce** was not labelled with the list of ingredients necessary for retail sale, and a much smaller jar of **Cocktail Cherries** had given undue prominence to the word "Maraschino", while the following word "Flavouring" was not nearly so obvious. This matter has now been rectified, but the packers are still reluctant to include the preservative present in the statement of constituents.

LABORATORY FEES

The fees received during the year ended 31st December, 1969 amounted to £2,592 17s. 0d. This figure includes charges of £500 to the Borough of Weston-super-Mare and £1,208 to the Diseases of Animals Committee, which is now no more, the responsibility for fertilisers and feeding stuffs being transferred to the General Purposes Committee.

TABLE 1

SUMMARY OF SAMPLES ANALYSED DURING 1969

Somerset County Council

Food and Drugs Act			3,099
(a) Milks	1,700		
(b) Food and Drugs	1,289		
(c) Appeals to Cow	12		
(d) Private Samples	98		
Trade Descriptions Act			21
Pharmacy and Poisons Act			1
Consumer Protection Act			8
Road Safety Act			7
Fertilisers and Feeding Stuffs Act			369
(a) Fertilisers	53		
(b) Feeding Stuffs	183		
(c) Additive Determinations	133		
Milks for Penicillin Test			839
Creams for Penicillin Test			57
Waters and Sewages			733
(a) Drinking Waters	95		
(b) Sewages	105		
(c) Effluents	457		
(d) River Waters	18		
(e) Trade Wastes	52 52		
(f) Miscellaneous	6		
Foods for Pesticide Test			236
Miscellaneous Samples			631

Borough of Weston-super-Mare

Food and Drugs Act		151
(a) Milks	9	
(b) Food and Drugs	140	
(c) Private Samples	2	
Miscellaneous Samples		Nil
GRAND TOTAL		6,152

TABLE II

COUNTY FOOD AND DRUG SAMPLES

(Excluding Private Samples)

Article	Number examined	Number adulterated or incorrect
Alcoholic Drinks	13	–
Artificial Sweetening Products	1	–
Baby Foods	1	–
Baking Powder	2	–
Butter	29	2
Cakes, Biscuits and Bread	48	1
Cake and Pudding Mixtures	8	–
Cereal Products	39	3
Cheese and Processed Cheese	67	2
Cocoa and Drinking Chocolate	11	–
Coffee and Coffee Products	34	1
Condiments and Spices	14	–
Cream	48	1
Dried Fruit	28	4
Fish Products	36	1
Flavourings and Colourings	24	1
Food Drinks	8	–
Fruit and Fruit Juices (canned, etc.) ..	50	4
Herbs	1	–
Honey	8	2
Ice Cream and Dairy Ice Cream	11	–
Livers	123	13
Margarine	13	–
Meat and Fish Pastes	15	–
Meat Products (canned)	71	5
Meat Products (open)	52	7
Milk, Channel Islands	713	2
Milk, Ordinary	987	7
Milk Products	27	–
Mincemeat	8	–
Nut Products	2	–
Oils and Fats	18	–
Pickles and Sauces	7	1
Preserves	41	4
Puddings	12	1
Salad Dressings	8	–
Sausages, Beef	20	–
Sausages, Pork	41	–
Shredded Suet	5	–
Soft Drinks, concentrated	23	1
Soft Drinks, ready-to-drink	24	1
Soups	2	–
Sugar and Sugar Products	3	–
Sweets and Chocolates	11	–
Table Jellies and Gelatine	16	–
Tea	30	–
Vegetables (canned, etc.)	44	2
Miscellaneous	5	–
Drugs	187	6
TOTALS ..	2,989	72

TABLE III

UNSATISFACTORY FOOD AND DRUGS

No.	Article	Result of Analysis
15	Cake Fruit Mixture	Stated order of ingredients incorrect in all 3 packets.
23	Food Colours with 'drop' control	Names of colours on label not in accordance with Regulations.
137	Orange Drink	Excess of cyclamate sweetener present.
140	Dietetic Wafer	Labelling unsatisfactory, including statements in grains, which should have been in grams.
240	Apricot Jam (F)	Contained not more than 34.0 per cent fruit.
490	Golden Massage Balm	No declaration of active ingredients in this medicine.
693	Stewed Steak in Rich Gravy (canned)	Contained not more than 67.9 per cent meat.
792	English Pigs Liver	Contained 12.0 parts per million arsenic.
950	Cornish Pasty Filling	No specific declaration on label of meat ingredient.
955	Muscatels	Contained 0.6 per cent mineral oil.
1068	Soothing Powders	This laxative should not be described as a soothing powder.
1338	Dressed Crab	Contained not more than 88.7 per cent crab meat.
1665	Lemon Juice	Contained deposit of mould spores.
1694	Pigs Liver	Contained 185.0 parts per million copper.
1701	Ox Liver	Contained 85.0 parts per million copper.
1704	Pigs Liver	Contained 57.0 parts per million copper.
1709	Pigs Liver	Contained 3.5 parts per million arsenic.
1854	Pigs Liver	Contained 2.5 parts per million arsenic.
1855	Pigs Liver	Contained 1.2 parts per million arsenic.
1914	Pigs Liver	Contained 102.0 parts per million copper.
1973	Double Cream (F)	Contained only 46.8 per cent milk fat.
2088	Pigs Liver	Contained 1.2 parts per million arsenic.
2180	Lambs Liver	Contained 60.0 parts per million copper and 2.7 parts per million lead.
2316	Ox Liver	Contained 92.0 parts per million copper.
2525	Plain Flour	Chalk content 150 milligrams per 100 grams.
2534	Stewed Apple Extra (canned)	No list of ingredients on label
2642	Corned Beef	Contained 9.3 parts per million lead.
2650	Plain Flour Compost	Chalk content 60 milligrams per 100 grams.
2652	Wheat Diet	Inaccuracy in statement on label concerning carbohydrate content.
2661	Smyrna Figs	Infested with mites.
2758	Ox Liver	Contained 96.0 parts per million copper.
3504	Pastie	Should be described as Meat and Potato Pasty.
3122	Pure Honey	Contained 190 mg./kg. hydroxymethylfurfural.
3234	Stuffed Manzanilla Olives	Vinegar present in the brine, without declaration.
3616	Steak Pies	Contained on average not more than 18.5 per cent meat. Should be described as Steak and Onion Pies.
3769	Dried Fruit Mixture	Incredients declared in incorrect order.
3900	Meat and Vegetable Pasty	Contained on average not more than 12.2 per cent meat.

No.	Article	Result of Analysis
3917	Italian Sweet Peppers in Wine Vinegar	No declaration of ingredients.
3919	Chopped Spinach (canned)	Contained 3.0 parts per million lead.
3964	Back, Kidney & Bladder Pills	Unsatisfactory labelling and composition.
3977	Fancy Fruit Salad (canned)	Ingredients listed in alphabetical order.
4102	Steak and Kidney Pie	Contained on average not more than 14.1 per cent meat.
4111	Christmas Pudding with Brandy Flavour Sauce	Fat content not more than 4.4 per cent.
4386	Pasty	Should be described as Meat and Vegetable Pasty.
4494	Chopped Spinach (canned) (F)	Contained 3.0 parts per million lead.
4604	Pigs Liver	Contained 62.0 parts per million copper.
4609	Pasty	Should be described as Meat and Vegetable Pasty.
4617	Pure Honey Orange Marmalade	Contained 220 parts per million sulphur dioxide preservative.
4618	Sugar-free Lime Marmalade	Declaration of ingredients not clearly legible or conspicuous. Claim to be free from sugar incorrect.
4731	Dairy Butter (F)	Contained 16.2 per cent water.
4848	Coffee white with sugar and milk	Should not be sold under this description since it consists of coffee, sugar and dried skimmed milk with non-milk fat.
4849	Steak and Kidney Pies	Contained not more than 21.3 per cent meat.
4933	A Vitamin Syrup	Deficient of stated Vitamin A content.
5046	Low Fat Curd Cheese	Should be described as Medium Fat Curd Cheese.
5165	Shandy	Contained 2.57 per cent proof spirit; stated to contain less than 2 per cent.
5373	Farmhouse Butter (F)	Contained 17.6 per cent water.
5418	Curried Chicken and Mushrooms	Contained inadequate amount of mushrooms.
5425	Multivitamin Tablets	Deficient of stated proportion of iron.
5500	Honey	Contained 87.0 mg./kg. hydroxymethylfurfural.
5502	Blackcurrant Jam	Contained only 16.3 per cent fruit.
5633	Minced Steak and Onions with Gravy	Contained not more than 44.0 per cent meat
5739	Danish Mozzarella Cheese	Should be described as Full Fat Soft Cheese.
5755	Cough Linctus	Deficient of stated 5.0 per cent chloroform.

(F) = Formal

TABLE IV

FEEDING STUFFS

Article	Total Number	Number Incorrect	Number Unsatisfactory
Sow and Weaner Meal	19	–	1
Growers Pellets	11	–	–
Finisher Meal	7	1	–
Breeder Nuts	6	–	–
Fattening Meal	6	1	1
Rearing Meal	8	1	1
Other Pig Feeds	9	–	–
Baby Chick Mash	7	–	–
Battery/Deep Litter Mash	9	–	–
Growers Mash	10	–	2
Layers Mash	20	–	–
Turkey Feeds	3	1	–
Other Poultry Feeds	6	–	–
Dairy Cubes	21	2	3
Milk Meal	4	–	1
Calf Rearing Cubes	10	1	–
Fattening Nuts	8	2	1
Concentrates	3	–	–
Barley	3	–	–
Cereal Nuts	3	–	–
Other Cattle Feeds	10	1	1
TOTALS ..	183	10	12

TABLE V

FERTILISERS

Article	Total Number	Number Incorrect	Number Unsatisfactory
Bone Meal	3	–	1
Chrysanthemum Fertiliser	1	–	–
Dried Blood	2	–	–
Fish Compound	2	–	–
Growmore Fertiliser	8	4	1
Hoof and Horn	1	1	–
Lawn Fertiliser	3	1	–
Liquid Fertiliser	8	–	1
Phosphates	2	–	–
Plant Food	5	–	1
Rose Fertiliser	4	1	1
Sulphate of Ammonia	4	–	–
Sweet Pea Fertiliser	1	–	–
General Compounds	9	1	–
TOTALS ..	53	8	5

TABLE VI

UNSATISFACTORY FERTILISERS AND FEEDING STUFFS

Sample Number	Article	Nature of Irregularity
15	A Proprietary Fertiliser	The amount of water-soluble phosphoric acid found was 1.85 per cent less than the amount stated.
18	Milk Nuts (F)	No declaration of urea content was made.
20	Rose Fertiliser	The amount of nitrogen found was 1.7 per cent more, the amount of water-soluble phosphoric acid found was 1.6 per cent more, the amount of water-insoluble phosphoric acid found was 1.3 per cent less and the amount of potash found was 5.0 per cent less than the amounts stated.
46	Organic Liquid Fertiliser	The amount of water-soluble phosphoric acid found was 1.0 per cent less than the amount stated.
60	Growers Mash (F)	The amount of fibre found was 1.8 per cent more than the amount stated.
71	Bone Meal	The amount of phosphoric acid found was 3.4 per cent less than the amount stated.
90	Growmore Fertiliser	The amount of potash found was 2.2 per cent less than the amount stated.
99	Dairy Nuts (F)	The amount of oil found was 1.1 per cent more and the amount of protein found was 2.4 per cent less than the amounts stated.
118	Dairy Cake without Urea	Found to contain 2.0 per cent urea, without due declaration.
120	Pig Breeder Concentrate (F)	The amount of oil found was 1.5 per cent more and the amount of fibre found was 1.8 per cent more than the amounts stated.
126	Sow & Weaner Meal (F)	The amount of urea present should be declared in the manner required.
127	High Energy Beef Fattening Cubes (F)	The amount of oil found was 1.4 per cent more than the amount stated and the amount of urea present should be declared in the manner required.
177	Pig Rearing Pencils (F)	The amount of oil found was 1.3 per cent more than the amount stated.
194	Pig Fattening Meal (F)	The amount of copper found was 94 parts per million less than the amount stated, being only 26 parts per million.
219	Super Crown Nuts (F)	The amount of protein found was 2.1 per cent less than the amount stated.
222	Coarse Dairy Ration (F)	The amount of oil found was 0.9 per cent less and the amount of protein found was 3.9 per cent less than the amounts stated.
228	Intensive Growers (VA) (ACS) Meal (F)	The sample did not contain the coccidiostats amprolium, sulphadimidine or sulphaquinoxaline, as declared.
TOTAL = 17		

(F) = Formal

MISCELLANEOUS SAMPLES

Classified List

Foods tested for pesticides 236

90 Fresh fruits and vegetables
8 Canned and dried fruits
37 Meat products
31 Fats
8 Eggs
16 Milks
14 Baby foods
25 Cereal products
7 Teas

Other samples tested for pesticides 135

17 River waters
52 Trade wastes
54 Sewage effluents
3 Drinking waters
1 Sludge
1 Pig feed
1 Pig's stomach contents
2 Dead fish
1 Herbicide
1 Flies
1 Pesticide
1 Fungicide

Dairy products tested for antibiotics 896

839 Milks
57 Creams

Samples from doctors and hospitals 47

38 Urines for amphetamine
2 Urines for copper
1 Urine for mercury
1 Urine for albumen and sugars
5 Bleach solutions

Samples for laboratory investigation 34

13 Chicken livers for arsenic
1 Chicken meat for penicillin
7 Cough Sweets
1 Flour
2 Cans of peas
1 Lime juice cordial
7 Pig feeds and supplements for arsenic
1 Lime water
1 Two-stroke oil

Waters and Deposits 139

5 Dairy rinse waters
60 Samples from swimming pools
5 Waters from Mendip caves
35 Drinking waters for metals

Waters and Deposits (continued)

8 Drinking waters for special tests
6 Water supplies to schools
2 Pond waters for pollution
1 Well water re. use in boiler
1 Sea water from Museum
6 Samples re. oil pollution of water
2 Pool waters
4 Stream waters and sludges
1 Sewage for milk waste
1 Deposit for calcium salts
2 Sludges for calorific value

Other samples 276

118 School Meals samples
42 Pigs livers etc. for arsenic
2 Alcoholic drinks for export certificate
1 Bacon rind
1 Berries for wine-making
8 Bovine urines for fluorine
1 Cake
1 Cattle food
1 Chocolates
3 Collars, starch and water for iron
2 Copper pipes
6 Creams for metals
5 Dead birds
1 Deposit from heating system
1 Dust from parked cars
2 Foam rubber pieces
2 Iced lollies
2 Insects
1 Iron injection for pigs
1 Lemon juice
1 Material from house
1 Meat paste
5 Milks
1 Moulding
1 Paint from cot for lead
3 Pool covers
3 Poultry meals
1 Powder, white
1 Powder, yellow
1 Putty for additives
1 Rattle
1 Road dust
1 Sewage for detergent
1 Sheep dip
1 Silage for evaluation
2 Sludges for oil
1 Smut deposit
8 Soils re. underground tanks
15 Soils from County Architect
2 Spirits for added water
2 Stones for sulphate
1 Stream water for detergent
14 Tomato pastes for metals
1 Wallpaper
6 Wood samples re. paint layers

TOTAL NUMBER OF SAMPLES: 1,763

TABLE VII

WESTON-SUPER-MARE FOOD AND DRUG SAMPLES

Article	Number examined	Number adulterated or incorrect
FOODS		
Alcoholic Drinks	3	–
Butter	2	–
Cakes, Biscuits and Bread	7	–
Cereal Products	5	–
Cheese	2	–
Condiments and Spices	4	2
Cream	5	–
Dried Fruit	1	–
Fish Products	6	–
Food Drinks	2	–
Fruit and Fruit Juices	10	2
Fruit Pies	5	–
Herbs	1	–
Margarine	1	–
Meat Products (canned)	16	2
Meat Products (open)	7	–
Milk, Ordinary	9	1
Milk, Channel Islands	1	–
Milk Products	6	–
Mincemeat	1	–
Nut Products	1	1
Oils and Fats	5	–
Pickles and Sauces	8	–
Preserves	5	–
Puddings	5	–
Pudding Mixtures	1	–
Sausages	6	–
Shandy	1	–
Soft Drinks, concentrated	2	–
Soft Drinks, ready-to-drink	4	–
Soup	5	1
Sugar	1	–
Sweets and Chocolates	2	–
Vegetables	3	–
Vinegar	1	–
Miscellaneous	6	1
DRUGS		
Bronchial Misture	1	–
TOTALS ..	151	10