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County of Somerset

ANNUAL REPORT

OF THE

COUNTY ANALYST

FOR THE YEAR

1971

JOAN D. PEDEN, B.Sc., M.Chem.A.. F.R.I.C.,

County Analyst.

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SOMERSET COUNTY LABORATORY

Staff at 31st December, 1971

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SOMERSET COUNTY COUNCIL

HEALTH COMMITTEE

ANNUAL REPORT OF THE COUNTY PUBLIC ANALYST FOR THE YEAR 1971

Mr. Chairman, Ladies and Gentlemen,

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

At a time when coinage, counties and common markets are all in the process of changing shape, the pattern of Public Service by the Laboratory is also altering, to a certain extent.

More analytical work is being undertaken for other County Departments, in addition to the statutory commitments under the Food and Drugs Act. Many specimens of blood sera are now regularly checked for lithium levels on behalf of local hospitals, a monthly survey of pollution in rain water on a certain area of the Mendips carried out and a start made on a comprehensive study of heavy metal pollution on the Somerset coast. The demands for analysis of specimens taken under the Road Safety Act has also increased.

Serious consideration is now being given as to the best use of the Laboratory's resources in the study of the grave pollution problems arising largely from the impact of waste disposal on our surroundings. These include the release of dusts and gases from factories, quarries, kilns and car exhausts, the massive accumulations of solid garbage and the constant flows of drainage liquids and wash-waters into rivers and estuaries.

The relatively new Department of the Environment is vitally concerned with these problems on a national basis and is interested in the results obtained by those local authorities equipped to carry out investigations; first-hand and on-the-spot data will always be most valuable in this context.

In some ways 1971 has been a rather difficult year. Commencing in June, the Laboratory was literally torn apart for a period of two months. It was necessary to replace outworn plumbing which had been, unfortunately, encased in several tons of solid concrete; this had to be drilled away during working hours, which led to severe headaches on the lower floors of County Hall. At the same time, two former offices were converted to Laboratory use, the Factory Inspector decreed the provision of a fire door, which involved another large hole in the wall, and re-roofing operations were taking place overhead. All in all, normal analysis was far from easy and sometimes downright impossible, during this reconstruction period, but the final result is very satisfactory.

Senior members of staff attended conferences on New Proteins, Water Treatment and Electrophoresis during 1971, visited the Government Chemist's Laboratory and acted as hosts to the Society of Dairy Technology,

County Inspectors of Weights and Measures and the South Western Zone Group of Public Analysts, during the year. Lectures were given to Public Health Inspectors on a Refresher Course and to a wide variety of organisations in the County, including the Somerset Farm Institute, Staff Nurses at Musgrove and a school Biological Society.

Due to difficulties created by the postal strike, the member of staff who left in November 1970 was not replaced until July 1971, although choice could finally be made from over one hundred applicants, for this and the additional post. All members of the present staff have worked as a good and efficient team; it is my pleasure to thank them and to express my gratitude to all colleagues and Committees for their interest and goodwill.

I am, Mr. Chairman and Members,
Your obedient Servant,

JOAN D. PEDEN

April 1972.

UNSATISFACTORY FOODS

The total number of samples submitted under the Food and Drugs Act by the Chief Inspector of Weights and Measures was 2,409, including 1,211 milks and 25 Appeals-to-Cow. Of these, 78 samples were reported to be unsatisfactory for one reason or another.

Reasons lie at various levels, from a slight inaccuracy in labelling claims to the highly undesirable presence of a thriving colony of food mites or the absence of some required ingredient, like meat in a meat pasty. Judgement must be made in the light of the appropriate statute or case law (often capable of a wide variety of mis-interpretations) less official codes of practice, trade agreements, laboratory records, personal experience and applied common sense.

It is to be hoped that common sense will also apply to the revisions in food law made necessary by entry into the Common Market. Standards are very different in some cases–German sausage manufacturers are already uneasy about the unfair competition from their starchy British rivals, for instance, and, for some products, hoisting a British flag would indeed mean raising a British Standard.

DAIRY PRODUCTS

There is a certain discrepancy between the figure of 75 adulterated samples in Table II and the total of 78 quoted above, but there is a reason for this. In fact, 3 of the 25 samples taken in Appeal to the Cow had to be returned as unsatisfactory, by reason of the presence of added water. This situation is legally impossible, but was nevertheless a practical fact.

Appeals are taken by milking the cows under the eagle eyes of the Inspector, with all possible precautions against abstraction, obstruction or other forms of malpractice, simply to establish the true quality of the natural product. It therefore follows that Appeals **must** be genuine, although one of the oldest stories in public analysis tells of the farmer who contrived to conceal a bladder of water beneath his smock at milking-time. In spite of being under observation, carefully-judged squirts into the bucket gave a highly abnormal Appeal sample.

The link between udder and receiver is no longer the horny hand, however, but the pipeline to the bulk tanker, and the cow accustomed to the suction cup would not give her normal yield by any other method of milking. Appeals-to-Pipeline must therefore be made, and this suffers from the defect that the pipe is very difficult to dry completely after washing. Traces of water, in amounts of 0.4 and 1.9 per cent, were perforce certified as being detected in the unsatisfactory Appeals, the first to flow through the damp pipe. This still failed to account for the volume of water originally found in the whole bulk, but further samples were genuine.

The entire episode was repeated in a further case, four samples of homogenised milk each showing added water in the region of 2.0–2.5 per

cent, the "Appeal" having not less than 1.1 per cent extra water. The actual amounts of extraneous water were probably greater than this, since the extreme value for a normal single cow is used to calculate the figure, from the freezing point, and bulk gallonages iron out individual differences. Calculation from the average value will then be nearer to the truth.

Modifications to the milking system were proposed, in any event, which should make drainage of washings more complete. All the 441 Channel Island milks were of good composition, but 24 of the 745 ordinary milks were not.

All but two were reported to be deficient of fat, on the presumptive standard of 3.0 per cent; 12 samples came from the same source and the fat contents ranged uniformly from 2.4 to 2.6 per cent. On this occasion, normal Appeals could be taken and some of the fats were found to be naturally low. Extremes of 2.00 and 3.80 per cent were registered, the rest of the 13 Appeals having fats between 2.80 and 3.35 per cent.

A very poor milk had a fat of only 1.65 per cent, but this was followed by 6 Appeals and one of these was nearly as low.

The dairy samples tested for freedom from the undesirable presence of antibiotics were 390 milks and 3 creams. Rather more than usual were found to be contaminated, the total being 16, although half of these showed no more than the faintest positive. The other 8 came in pairs from each offending farm, as follows:-

Sample No.	Farm	Penicillin (International Units per ml.)
AB.23	A	0.50
AB.26		0.10
AB.51	B	0.20
AB.52		0.50
AB.146	C	0.11
AB.148		0.08
AB.246	D	0.06
AB.247		0.25

Proportions of penicillin below 0.05 I.U./ml. are regarded as traces and none of the above results are highly excessive, but there is no reason why consumers should suffer this compulsory medication at all and the farmers are so advised. The information is also passed to the appropriate Ministry.

Other dairy products criticised were 2 cheeses, 2 yogurts and a **dried skimmed milk**. This latter sample contained more than the 5 per cent water allowed by Regulation. The powder does absorb water very rapidly if not kept tightly sealed and it is necessary to analyse it as soon as the protective paper liner has been broken.

The samples of **yogurt** contained apricots and a mixture of raisins and brazil nuts, respectively, and were not labelled exactly in accordance with requirements. Yogurt is not controlled by any kind of compositional laws and may vary from an excellent full-fat natural product, now hard to find, through the general run of low-fat mixtures to the poorest-quality commercial compounds of dried bacteria, hydrolised starch, skimmed milk, saccharin, gum and fat, with added calcium acetate, sodium phosphate and preservatives. Not quite the stuff which traditionally produces centenarians in Serbia, one would think.

A wrapped piece of supermarket **cheese** was sold as Cheddar when it was actually a processed type and a cartoned cheese, blended with wine, also contained a heavy mould growth.

MEAT PRODUCTS

Sausages continue to be submitted, mostly on a formal basis, and the quantity of meat is nearly always sufficient, although fat contents are sometimes undesirably high. The total results are listed below:-

	Pork Sausages	Beef Sausages
Number of Samples	48	24
Minimum standard %	65.0	50.0
Average meat content %	70.7	62.4
Range of meat contents %	82.2–59.6	87.4–51.4
Range of fat contents %	38.9–14.7	34.0–12.6

One sample only was deficient of meat, a pork sausage which contained not more than 56.9 per cent.

The occasional sausage declared to be made from a mixture of meats is included in the lower, beef standard—one such sample was criticised mildly for being described on the wrapper as "Pork and Beef", full stop, (which calls for a meat content of 95 per cent) without mention of the necessary word Sausages. This word drops the meat requirement to the actual 50 per cent. Most Continental or Common Market Sausages operate at a 100 per cent level, so it will be interesting to see if changes are made in this traditional dish.

Changes in the cheaper **meat pasties** could only be an improvement, it seems. Provided the pastry is sufficiently greasy and a few meat fibres can be detected in the interior, it takes an extremely poor pasty to fail the regulation test. One sample had a proportion of 16.8 per cent meat, calculated from the filling alone; addition of the official proportion of pastry fat gave a total of 22.4 per cent meat, still below the standard 25 per cent. Some pasties are rescued at this stage, by the further proviso that pies weighing less than 4 ounces are satisfactory if the meat weighs seven-eighths of an ounce or

more, but these were still deficient. The presence of a smell of onion probably qualified them for sale as "Meat and Vegetable" or Cornish pasties, when the standard drops to 12½ per cent meat. A similar comment applied to a pasty containing potato. It is perhaps worth noting that a "Vegetable and Meat Pie" has no standard at all.

A **devilled ham paste** from Australia was described as "a delicious subtly-seasoned spread with a real country-style smoky tang". Meat pastes were once required to contain only 55 per cent meat, while fish pastes needed more than 70 per cent fish to pass, but both standards have been fixed at 70 per cent since March 1971. Word had not reached Australia in time, apparently, and the subtly-seasoned spread had only 58.8 per cent meat. A **canned ham** was more seriously deficient; the 1 lb. can contained less than 11 ounces of solid meat, the rest being jelly. The description on the label required at least 90 per cent of the contents to be meat, although qualification with the words "in natural juices, gelatine added" would have removed all compositional controls. A formal sample was not quite so jellified and just achieved the official limit.

Another statutory instrument came into force in September, amending the Preservatives in Food Regulations. The perfect pickling or curing of meat, notably hams and bacon, is still something of an art and craft, but the ingredient common to all processes is sodium (or potassium) nitrate, known as saltpetre. Reduction to nitrite and combination with the haemoglobin in the blood fixes the colour of the cured meat at an attractive pink instead of unappetising gray. The amounts of nitrate and nitrite salts in the finished product have never been restricted, in the past, but there is now reason to believe that excess nitrate in the human diet is to be avoided—it has always been regarded as harmful in infant feeding. Fairly generous limits are now imposed: 500 parts per million nitrate (as the sodium salt) in bacon, ham or pickled meat and 200 parts per million sodium nitrite.

These limits were found to be grossly exceeded by a canned **ham and chicken roll**. The informal sample contained the equivalent of 970 parts per million sodium nitrate and the formal no less than 1,230 parts. Other canned meats tested all had far less than the limit, but this enormous excess, in old stock, does tend to confirm the wisdom of restrictive legislation.

Acidity is a sign of deterioration or over-processing in oils and fats and a sample of **beef dripping** with an abnormally high level of free fatty acids was criticised.

Mercury in tuna fish has been one of the pollution topics of the year, following the serious incidents reported near fisheries in Japan and the United States. The Government Chemist analysed over 60 samples of the canned product from U.K. stocks and published the results in a special report. Meanwhile, the Public Analysts of the South West Zone had been organising their own survey of mercury and other metals in over 200 samples of fish products and these findings were also published during the year.

The results of the Government Chemist showed that mercury levels in tuna fish ranged from 0.1 to 0.8 part per million, with a mean level at 0.3 part per million. The Public Analysts largely confirmed these figures, with similar extremes, from 0.1 to 0.9 part per million, but more samples at the lower levels.

The Somerset Laboratory did test one sample of tuna which had 0.7 part per million of mercury. While there is no official maximum limit for this toxic metal in this country, known limits in other lands vary between 0.5 and 1.0 part per million, so the content in this sample received an adverse comment.

CEREAL PRODUCTS

The law on **plain flour** has suffered an interesting reversal in the past century. It is a fact that bakers were once convicted for the offence of adding chalk, gypsum or pipe-clay to their bread; now an offence can lie in the failure to add enough chalk, which provides the essential calcium of our diet. To be fair, however, a huge excess would still be considered an adulteration. The problem of adding chalk accurately between the narrow legal limits has often caused the well-known trouble at t'mill. Two samples of flour contained 133 and 132 milligrams of creta praeparata (= prepared chalk) per 100 grams, instead of an amount between 235 and 390 milligrams.

An informal sample of **baking powder** was found to produce far less than the required minimum of 8 per cent available carbon dioxide. It gave only 3.54 per cent, was partly caked into a hard mass and had obviously been exposed to damp conditions. Premature addition of water is fatal to this product, since the raising gas is thereby lost. The cardboard drum was not entirely waterproof and metal containers with tight lids are preferable. The formal sample contained only 2.72 per cent carbon dioxide.

Butter biscuits have been the subject of heated discussions for some years now and no final compromise has yet been reached, between those who think that **butter shortcake biscuits**, for instance, should be made with no fat other than butter, and the trade members who consider a moiety of butter suffices, provided disclaimers are made. This latter course seems to be rather poor in principle and open to some abuse. Partial substitution of other fats, without any disclaimer, cannot be right, however, and neither can the article advertised as "the digestive biscuit with the butter in it", when as little as 1.4 per cent of butter fat was present; the total fat content was 20.5 per cent. Both were adversely criticised.

FRUITS AND SWEETS

Half of the unsatisfactory foods in this group consisted of **dried fruit**, imported in small wrapped packs. Numbers of living mites were discovered inside the cellophane packets of **figs** and **apricots** from Turkey, **mixed fruits** from South Africa and a sample of apricots described merely as

'foreign' by the importers; parts of insects were found in **dates** from Iraq. Another pack of **dried apricots** contained more than the permitted 2,000 parts per million of sulphur dioxide preservative.

A sample of "finest Malaga muscatel **raisins and almonds**" from Spain was sent in because somebody considered they were **not** the finest and examination did tend to confirm this. According to a Spanish decree of 1927, Inspectors stamp the export crates of muscatels with a certain number of crowns (although this may have changed since then), denoting size principally, in the grades Reviso, Medio Reviso, Aseado and Corriente. For the biggest, only 45 raisins weigh 100 grams and, in the smallest category, it takes 130 to make this weight. This lowest grade was just achieved by the present sample: the raisins were also hard in texture, and not of the best quality. The printed name and address of the packer was almost invisibly small on the label of the carton, furthermore, and therefore did not comply with Labelling Regulations.

Three other foreign products qualified for adverse comment on their labels; two of them were plastic cartons of a species of Viennese custard packed in France and labelled mainly in Italian, although a list of ingredients in English was printed in very small type around the edge of the foil lid. "Viennois Chocolat" was stated to contain "skimmed milk, whipped cream, sugar, cocoa, starch, carageen, salt, vanilla" and a similar product contained peach and pomegranate. An **instant milk shake** from Belgium also had inadequate labelling in English. Similar food/communication problems must be solved before the teething troubles of the Common Market are over and we are equipped to understand and to eat.

Confusion can also be generated at home, and a **cornish spread**, mainly sugars and honey, with some butter and single cream (delicious, but obviously not for slimmers) produced great argument before a suitable and correct label could be agreed.

An over-heated **honey** was criticised, the claims of a **sugarless jelly** were queried and a home-made **marmalade** on sale was reported to be slightly low in sugar.

DRINKS

There were 9 unsatisfactory samples in this section. Some bottlers had still not been able to recall all the old stock prior to January 1970, the date when the synthetic sweetener, cyclamic acid, was banned, and two low calorie concentrates—**blackcurrant drink** and **apple squash**—were found to contain cyclamate in proportions of 0.54 and 0.62 per cent, respectively. A formal sample of the blackcurrant drink showed a change of formulation, with the omission of cyclamate.

Another brand of **blackcurrant drink** offended by being deficient of sugar and having a compensating excess of saccharin, both in informal and formal samples. **Shandy** should now contain not less than 1.5 per cent proof spirit, if sold ready-mixed, this representing a reasonable, if not generous,

addition of ale or beer to the soft drink. One firm's bottled product has now shown a lower alcohol level in four samples over the past two years, the 1971 samples having 1.0 and 1.25 per cent proof spirit.

A product claiming to be "Germany's Finest **Fruit Drink** ... pressed from freshly-picked sun-ripened cherries" was sampled, the label further stating: "Its valuable ingredients—minerals, organic acids and fruit-sugar help promote natural health and vitality". In a sense, all other foodstuffs perform this same general function, but if specific mention of minerals is made then, under British law, their nature and quantity must also be made clear.

Certain kinds of **instant coffee** have been treated to remove the stimulant, caffeine, since some people prefer not to be stimulated all of the time. It should be obvious at the time of purchase, and coffee treated in this way must be prominently labelled "Decaffeinated". Ordinary instant coffee must, in the odd phrasing of the Coffee Regulations, "contain, as not less than 95 per cent thereof, the dried water-soluble solids of coffee", leaving the amount of caffeine open to argument. In a good product, it is usually around 4 per cent, while the maximum level of caffeine in a decaffeinated powder is 0.1 per cent. One product was not adequately labelled.

Most **malted milk** powders are pleasantly-flavoured mixtures containing some dried whole milk and a proportion of malted barley, thickened with flour and stabilised with alkaline bicarbonates. A certain brand had cocoa added for extra flavour and was also heavily sweetened; a 6-ounce jar contained nearly 2½ ounces of ordinary household sugar, although this would only be apparent before purchase from a careful study of the list of ingredients. The same product without benefit of chocolate flavour contained no sugar and the firm had agreed to amend the description in 1968.

Two unclassified unsatisfactory foods have still to be mentioned. A **salad cream** for low salt diets had a low oil content of 20.7 per cent instead of the statutory minimum of 25 per cent; the following formal sample contained 27.2 per cent oil. A canned **spinach purée** showed an excess of lead, with 5.2 parts per million, when the limit is only 2 parts per million. Here again, the incidence was apparently an isolated case, since the formal sample of spinach had only 1.3 parts per million of lead.

DRUGS

The majority of the 191 drug samples analysed in 1971 were entirely satisfactory, only 5 giving cause for adverse report.

A chemist's bottle of **sodium barbitone tablets** had been incorrectly labelled as "50 tabs. of 0.5 gm", when analysis showed them to be tablets containing 0.3 gram of the barbiturate. Not so dangerous, the error being in this direction, but less efficaceous, of course.

Some **tonic tablets** were described as a "protein-rich nutrition booster for extra energy" and were stated to be made from equal amounts of brewers yeast and honey. This was perfectly true, but each small tablet weighed less than half a gram or about 1/60th of an ounce. It was directed

that 3 tablets be chewed at each mealtime, but an intake of 12 tablets per day would, it was calculated, provide only 2 per cent of the daily protein need and 1 per cent of the average calorie requirement. These somewhat low proportions could equally well be supplied by one-sixteenth of a pint of milk, at rather less cost.

A proprietary **ointment** was recommended for burns, scalds, bed-sores, ulcers, etc. The desirable effect was upon skin rather than social life, since one of the main ingredients was cod liver oil. Loss of the stated vitamin A content was due to the action of chlorine in another ingredient, it was clear, and changes to the label have now been made. (A pine cream emulsion also submitted was so like furniture polish that one wondered which kind of chest to rub.)

Antiseptic toilet soap was labelled in terms that brought it within the scope of the Pharmacy and Medicines Act, and products so recommended as actual medicines must state the percentage of active ingredients–in this case, the compound hexachlorophene.

A complex **tonic syrup** declared the presence of 4 metals, 5 vitamins and 7 amino-acids, with proportions of liver, spleen and "fresh gastric mucosa". The contents of the brown bottle were unsatisfactory, however, since most of the solid matter had settled out as a thick sludge. This made it most difficult to achieve the right dosage by spoonfuls and re-formulation was advised.

PRIVATE SAMPLES

Last year a record number of complaints regarding articles of food and drink was received, totalling 146. Almost as many were made in 1971, resulting in the submission of 134 samples, and for 89 of them the complaint was confirmed.

The staples of milk, bread and meat products naturally produced the most numerous examples of error. The solid white background of a full pint bottle of **milk** does show up the most minute traces of dark alien matter, whether floating or adhering to the glass. Of the 18 complaints only 3 did not relate to the presence of foreign bodies, ranging from minute fragments of vegetable debris (3 samples) or pieces of broken glass (2 samples), to single examples of a woodlouse, a grub, a paper label, mould growth, rust, a large smear of clay, general dirt, bird-droppings and an entire metal chain in a pint of sterilised milk. There was a single occasion when a bottle of milk alleged to contain a number of hay-seeds was submitted, but close examination showed that all the small greyish flecks were actually imperfections in the glass of the bottle itself.

A milk sold in cartons by a supermarket was confirmed as slightly sour at the time, but extreme sourness made it impossible to check on the alleged bitter taste of another milk, by the time the two teaspoonsful arrived at the Laboratory. The remaining sample of milk was thought to be watered, but found to be quite satisfactory.

All the 17 samples of **bread** considered by the purchaser to possess some undesirable feature were reported to be unsatisfactory, some of the reasons being very obvious, like the body of an insect or a rusty screw. There were six complaints of dark stains or smears in the crumb, mostly grease and iron from contact with oiled bakehouse machinery or burnt starch.

Several slices of bread from the same wrapped packet were sent in by a puzzled purchaser who complained that they had been covered with a bright pink powder—could it be identified? Microscopic examination showed that the powder was a mass of mould colonies, in fact. Moulds come in many varieties of forms and in every colour of the rainbow, as do other chromogenic organisms, such as the bacteria. The pinkish-apricot colour of, say, *tricothecium roseum*, can be disconcerting if one is under the impression that all moulds are green.

By something less than a coincidence, three very similar samples were submitted in the mild weather at the beginning of September. Although discovered at Dunster, Wellington and Wiveliscombe, the wrapped sliced loaves had all originated in the same bakery at the same time. Mould spores are always with us and it is impossible to exclude them from the air of factories; enclosure in waxed paper provides ideal growth conditions, if any spores have settled on the batch of bread.

Two other bread samples contained insect fragments, two had textile fibres present and one had a considerable collection of mixed fibres within its wrapper, including a length of grey sewing thread, dyed wool, straw, a long dark animal hair and a nylon bristle—the complainant had sent his own toothbrush for comparison with this last specimen, and very similar it was.

Meat products gave cause for 19 complaints, of which 15 were found to be justified. Samples of veal and of pork luncheon meat suspected to have caused illness were chemically in the clear and a canteen meal of chicken curry and rice, alleged to have a "funny taste" was thought to be acceptably normal, although appraisal of curry will always be a very personal matter of opinion.

Sympathy was felt for the purchaser of certain Cornish pasties, who claimed that they must be deficient of both meat in filling and filling in pasty, but the standard is indeed very low. Only 12½ per cent meat is the Regulation minimum, and this can include some fat from the pastry. The pasties in question were described as "a fine product" by their manufacturers and actually contained 16 per cent meat.

Solid packs of canned meat are often subject to some blackening or surface discolouration, where the natural sulphur from the meat meets the iron from the can, particularly in the region of the seam closure. Iron sulphide is unsightly, but not toxic, and samples of corned beef, chopped ham and chopped pork with cereal were reported accordingly. A can of pork luncheon meat in which an old and slightly mouldy lump of meat had become embedded during manufacture was, however, the subject of prosecution by a Borough Council, when fines and costs totalling £39 were imposed.

Another pack of pork luncheon meat looked as if somebody had rubbed it over a dirty floor; one surface was covered with a black gritty layer containing fragments of brick and stone, wood fibres, general filth and detritus. Foreign bodies in other samples included mould in a pie, a cooked beetle in some canned roast beef and gravy, fragments of sisal (from which coarse twine is made) in a can of steak pie filling and a dark hairy object which seemed to be a small piece of cowhide in chili con carne, a South American stew of beef and peppers, canned in Yorkshire on this occasion.

An odd patch of green discolouration inside a piece of boiled bacon was found to be a lymphatic gland, as the public health inspector had suggested, but the green colour remained a mystery. One possible explanation was the injection of the living pig with some dyed drug. A local veterinary surgeon supplied, for comparison, an anti-bacterial compound which was coloured a very similar shade, so the theory remained tenable but not proveable.

Some prepacked skinless sausages showed yellow discolouration due to incipient putrefaction, and the accompanying change to an alkaline reaction, also confirmed by the odour and slightly slimy state; some meat delivered to a school was also decidedly "off". Colour changes in frozen hamburgers led to adverse comment by purchasers—it is difficult to retain the fresh red appearance of some minced meat products for long, and these were rather an unappetising pale brown colour, although still fit for consumption.

One interesting development arose from a complaint of dark matter in slices of corned beef sold "loose" by a retailer, which proved to be unsatisfactory in quite another way. The process of 'corning' takes place mainly in Latin America and Australia, where there is a large local supply of beef. The meat is first cured in a solution of salt and sodium nitrate, which fixes the red colour, then concentrated by cooking into the familiar solid mass. When the meat content is calculated by the usual methods, used for sausages, etc., it therefore has a meat **equivalent** in the region of 120–130 per cent.

The samples examined in connection with the complaint contained only 80 per cent meat, together with starchy filler, not present in the normal commercial article. The inspector visited the retailer's premises to examine the original 6lb. can, which did appear to be labelled 'Corned Beef' at first sight, although, rather unusually, a product of the Republic of Ireland. Closer examination of the label, in a good light, showed the words 'In Cereal' printed in yellow on a white background below the black and conspicuous lettering of the words 'Corned Beef'. This very poor labelling had obviously misled the retailer of the product and representations will certainly be made as to its improvement. The black matter was, in fact, small pieces of skin.

One of the worst samples among the **fruits and vegetables** examined was a can of blackcurrants supplied to a school kitchen and found to contain a fibrous mass weighing over half an ounce. Discounting the fruit skins and seeds present as legitimately non-foreign, there still remained a collection of twigs, leaves and paper, quite sufficient to choke an unobservant child. It looked like the debris from fruit-washing at the factory, which had somehow been returned to one of the cans.

Another can of blackcurrants was sent from a hospital kitchen, with the complaint that the cook who opened it was now wearing a white overall with purple spots and did the near-bomb pressure inside the can mean anything harmful? Attack on tinplate can lead to the formation of gases, and cans then appear 'blown' and bulging, but this gave no such warning and the contents showed no metallic contamination. Yet another sample of blackcurrants—fresh ones this time—had been bought from a farmer and used to make blackcurrant tea, thought to have caused sickness and giddiness in those who drank it. An excess of pesticides was suspected, and traces of D.D.T. and B.H.C. were found to be present, but in such very low amounts that illness could not have been caused.

The contents of a can of pears showed the abnormality of bright blue flecks on the fruit and patches of blue matter around the inside of the can, which were obviously accidental and seemed to resemble marking-ink. Technically, the food was unfit for consumption under the Colouring Matter Regulations, since the blue dye was certainly not on the permitted list. The remains of a can of strawberries came from an anxious mother, who had been feeding them to her baby when she noticed specks of mud at the bottom of the can, she thought. The little black fragments in the remaining syrup, however, could all be seen as dark seeds, skin or other strawberry structures when viewed under the microscope and two other cans from the same stock were also satisfactory.

Two cans of lemon pie filling were submitted with the complaint that it did not set after cooking, as it usually did, but remained 'runny'. The yellow starchy paste was certainly very acidic, which does influence the way in which heated starch gels, and practical tests confirmed the lack of solidity of the final product, when prepared as directed; it was found to be from old stock.

Canned grapefruit produced two identical criticisms concerning the presence of 'white spots', but, as usual, these proved to be micro-crystalline masses of naringin, the bitter principle of this fruit. The third was not so routine, since the foreign body consisted of a rounded agglomerate of yellowish-green glue or lacquer.

Tomato juice was suspected as the cause of sickness on two occasions during the year, but was found to be free of any excess metallic contamination and normal in other respects. The surface of a cooked cauliflower was abnormal in colour when received, showing an intense yellow discolouration on the outside. A cauliflower is actually a botanical monstrosity, the flowerhead being aborted to give the solid mass of white curd which can be so delicious when properly cooked. Too much soda in the water, however, can sometimes produce this effect of yellowing the white, by making it too alkaline. The present sample was decidedly alkaline and became white when acidified.

Two short lengths of celery came through the post—one raw and one cooked—with a letter alleging that a strong 'chemical' taste was developed on cooking and an unpleasant smell, making the celery quite inedible. This could

not be confirmed after the passage of time, unfortunately—the trouble with 'taste' complaints is that they are both subjective and fugitive.

The construction of the motorway through parts of Somerset was the original reason why samples of lettuce and cabbages grown nearby were examined for fluoride in the contaminating dust. Vegetable patches near construction areas are bound to be affected to some degree, but the fluorine levels were of no danger to health and it was easy to remove the dust by washing.

Various faults discovered in **fish** led to the examination of 8 samples, 3 of which consisted of canned salmon. Perhaps that is not quite exact, since one of the cans surprised the purchaser by containing a solid mass of cooked eggs—many hundreds of eggs, in fact, which were in all probability laid by a female salmon—but were hardly of the nature, substance or quality demanded by someone buying a can of fish. For the other two samples, an unpleasantly strong and oily taste was confirmed in one, but a lack of colour and flavour in the other could not be supported.

Canned sardines were submitted when a public health inspector discovered a stock of two dozen cans showing suspicious bulges, and considerable attack upon the tinplate was evident when they were opened. Hydrogen gas was identified, under pressure in the head-space, and the fish showed excessive levels of tin contamination.

Many cans of salmon or tuna alleged to contain broken glass have been examined in the past, and the 'glass' proved to be the natural phosphate compound known as struvite, extracted from the bones, but this year was notable for the first discovery of this substance in canned kippers. Any bony fish can probably produce this phenomenon, given the right conditions.

A piece of fried fish did contain an entirely foreign object in the shape of a curved length of metal wire, but fish fingers, bought in bulk around Easter and consumed just before Christmas, were given a clean bill of chemical health, having been deeply-frozen in the interim.

A suspect scampi provided a much more interesting exercise in the relatively new technique of applied electrophoresis. This is a very elegant method of identifying fish species from their characteristic protein patterns. One piece of skinned fillet from a white fish looks exactly like every other fish fillet before cooking, although the differences in taste and texture after cooking are quite apparent to the consumer.

In the test procedure an extract of the white fish muscle is made and the soluble proteins kept in a sugar solution. A very small volume of this liquid is transferred to a cylindrical tube containing a clear acrylamide jelly and an electric current passed through the tube. Finally, the column of gel is stained with a blue dye, and a series of dark-coloured bands shows the distance each protein group has travelled along the tube. By this means exactly reproducible and characteristic patterns are given by each white fish, so that cod can be instantly distinguished from haddock, plaice from lemon sole and

turbot from halibut, for instance. The less familiar pollack, ling, megrim and witch all have specific blue bands. It was, in the case of this particular complaint, easily possible to tell that the golden-breaded scampi did consist of the authentic Nethrops Norvegicus (Norway Lobster, otherwise Dublin Bay Prawn, alias Scampi) and not some much cheaper substitute masquerading in batter.

Certified specimens of the real articles have been obtained from the Torry Research Station at Aberdeen, where the method originated, for setting up the original standards required.

Some sixteen **fatty samples** gave some cause for suspicion or complaint. Two different brands of butter were thought to be margarine (nobody has ever suspected the reverse, apparently) but analysis showed they were genuine; another was sent because supermarket customers had criticised its unusual flavour. After tasting it, the Health Inspector's own staff were divided as to its merits, and the same situation occurred in the County Laboratory. Five of the staff found it acceptable, although one thought it was "strong" and five made adverse comments, ranging from "acid" to "cheesy". On this basis, half the purchasers would be displeased.

The fourth packet of butter examined had a small piece of rather dried-up bacon embedded in the side. Another foreign body was the minute fragment of dark woody matter discovered in a carton of clotted cream. A group of seven plastic cartons of cream were submitted, both full and empty, in an attempt to find the cause of odour complaints concerning the packs. The cartons were made of polystyrene and it was confirmed that an unpleasant smell did develop when they were exposed to sunlight. This may have been due to traces of volatile plasticiser being released or to changes in the polystyrene itself under the influence of heat and light; the facts were reported to the manufacturers for their possible action.

A sample of 'fresh' single cream was confirmed as decidedly stale, but no micro-organisms could be detected in another complaint, nor could the cause of headaches and face-swellings be detected in the contents of three cans of sterilised cream. Somebody who bought some pasteurised double cream from a very large organisation thought it was much too fluid, but analysis showed that the fat content just exceeded the minimum of 48 per cent.

Yoghurt, in both raspberry and strawberry flavours, suffered from the presence of a circular mat of green and white moulds on the surface.

One of the newer products, a low-fat spread, was received because the consumers thought it had a soapy taste and experienced a fiery sensation in the throat after eating some. Analysis showed no rancidity or other abnormalities, and it appeared likely that the water present could have put out any fire, since the moisture level was in the region of 56 per cent, compared to the 15–16 per cent found in margarine or butter. A tub of soft margarine was examined for the presence of a powder, which the purchaser seemed to detect while eating it, but nothing powdery was actually present in the portion analysed.

Of the twelve complaints concerning cakes and other cereal products, nine were in connection with the presence of foreign matter. These included a white feather embedded in a nutty ginger cake, a length of jute fibre in some sponge drops and a tuft of animal hairs in the icing of a custard slice; prosecution by the Borough involved in this latter offence resulted in a fine of £10 for the bakery responsible.

Other items were mould growths on a slab of pre-packed puff pastry, a mouse dropping on a cream cake and the short length of string joining two circular ginger snaps, rather like the top half of a somewhat unusual bikini. A cream bun contained a cavity harbouring a long-dead insect and a packet of breakfast cereal included what was practically the ghost of a spider—one hollow shell with eight legs still attached, plus a quantity of web. An unusual addition to cornflakes was a hard lump of yellowish wax, which was found to have a similar infra-red spectrum to the waxy matter used to impregnate the paper liner of the packet; some factory mishap appeared probable.

An apple pie was received, with a complaint that it tasted of pickled onions or "something sharp like vinegar"; the acidity was on the high side for cooked apples, but not abnormally so, and no vinegar could be detected. Concern was felt for a Christmas pudding made in a school kitchen, when somebody thought they remembered that the bread used had been slightly mouldy, but the pudding had been well sterilised by long cooking and was appreciated by the Laboratory staff, although a little too spicy for some tastes.

One purchaser submitted a very badly-labelled bag of batter and pancake flour. The top of the packet was sealed with a tape which obscured both the list of ingredients and the statement that the product contained no eggs—not difficult, since the lettering of this disclaimer was particularly small. The fact that the sample was only a sub-standard self-raising flour coloured yellow was borne out by the inferior Yorkshire pudding it produced; it was agreed, in the report on this sample, that pancakes and Yorkshire pudding must contain egg to be the real thing.

There were 13 samples of **sweets and preserves** which failed to satisfy the consumer. A bar of chocolate had the whitish 'bloom' which so resembles a film of mould, but is actually only the sugar crystallizing on the surface, after exposure to light and heat, as in a shop window. Another chocolate-coated bar was alleged to contain a maggot, but careful search of the portion sent failed to reveal one, unlike the quarter-pound of nut toffee with a grey fluffy mass in the centre, consisting of a moth pupa, with associated webbing. This sample was followed by a large confectionery jar, containing the whole of the retailer's stock of nut toffee, and here the signs of insect life were even more evident. Two dead moths, 1 live grub, 3 pupae and a good deal of webbing, excreta and eggs were the total haul, with many instances of chew-marks on the nuts, which were almost certainly the source of this trouble. Infested nuts can be hard to spot in the initial stages and are not usually heated enough to kill all the forms of life.

Sweets in the form of strings of coloured beads caused a prolonged exercise in dye identification. The blue ones did, at first, appear to contain a non-permitted colouring matter, but it was agreed finally that the suspect shade was an impurity in the permitted colour, Indigo Carmine, which is liable to decompose on keeping.

A type of ice lollie was sold as a soft drink in a plastic sachet, to be frozen before use, and the mother of a child complained it had caused blistering of the tongue. It was a rather unattractive brown confection, flavoured with gingery spices, which were rapidly extracted on sucking the frozen stick. This concentration did produce a burning sensation in the mouth and might just possibly have caused a sore tongue in a child.

Three samples of honey were given special examinations. One complainant had been concerned about the appearance of her jar of honey, which had a thick white layer at the bottom and white streaks on the side and surface, the rest of the contents being the usual brownish-yellow colour. The white portions did consist of the normal sugars, however, crystallizing rapidly due to local over-heating at some stage. Another purchaser was convinced that his honey contained a quantity of wax, but none was present, in fact. The third complaint had some justification; the honey was imported in 56lb. drums and, during use, was seen to have discoloured streaks and patches. There was no oily contamination, as originally suspected, but the levels of zinc and iron in the sample were unusually high when compared to those of a control honey. The theory was that contact with the sides of the metal drum had produced the effect noticed.

The family who bought breakfast marmalade in 7lb. cans noticed something odd about the last pound in the can. Fermentation had taken place, to create an alcoholic product rather stronger than shandy and certainly containing more alcohol than the expensive preserves laced with liqueur. The masses of wild yeast cells responsible were clearly visible under the microscope. Not so visible were the 'hairs' suspected to be in a jar of lemon jelly marmalade. The wavy black lines, associated with air bubbles, in the clear jelly, actually proved to be fine trails of particulate dirt, which were even less desirable. The manufacturers agreed with this finding, identifying the 'dirt' as the lubricant graphite grease, occasionally found in the empty jars supplied to their factory.

Granulated sugar was thought to be contaminated, since it made the tea taste so odd, and tests showed that it did contain small white fragments of peppermint sweets—harmless, but quite sufficient to affect the flavour of tea. A sample of black cherry jam contained most of a dead wasp, which bore every sign of being cooked with the cherries and was dyed a rich reddish-purple.

A blackcurrant health drink **should** have been dyed a rich reddish-purple but was actually a rather unhealthy dark green colour. Chemical analysis showed a little blackcurrant juice, a high saccharin level in this low-calorie product, sufficient Vitamin C to meet the claim made and two artificial colouring matters—tartrazine (yellow) and indigo carmine (blue). It was

therefore not surprising that the resultant colour of the solution was green, but difficult to see why these particular dyes had been chosen, when a number of red and purple shades were available from the permitted list. The matter was drawn to the attention of the manufacturers.

Samples of sherry, blue cheese, orange squash and pickles were submitted on various occasions, under suspicion of causing sickness, diarrhoea or a pain in the neck, but no chemical contaminants were detected. 'Taste' complaints led to the submission of instant coffee (dusty), vinegar (spicy) and liver broth baby food (soapy), but Laboratory palates registered no dust, no spice and no soap. Pickled eggs did not get such a good reception, however, all tasters agreeing that the flavour was unpleasant and two refusing to taste at all, on account of the peculiar smell.

Cold fried egg is never the most appetising dish, especially when covered with black blotches. The fact that the blotches were brownish-black in the yolk and bluish-black in the white gave some clue, and chemical tests established that the stains were due to the presence of iron, from some source unknown, but possibly from the cooking pans. The egg was unlikely to be a danger to health, as it would probably have been rejected by most people.

Small black particles in lemonade, from a bottling plant considered by the local inspector to be out-worn and out-dated, turned out to be fragments of black rubber from perished pipe-lines, as he had suspected. In another soft drink, the deposit in the small sample received was almost entirely yeast cells. White gritty matter in a cheese spread resembled aggregates of the skimmed milk powder added during processing; the manufacturers thought that they might have used an excessive proportion of emulsifying salts.

Finally, two packets of sweet almonds did not appear to the purchaser to be in the best condition, showing signs of damage and abrasion. Careful microscopic search of the nuts showed many penetrating cavities, insect webbing and in one hole a large clutch of insect eggs, so only half the almonds could be regarded as satisfactory.

TRADE DESCRIPTIONS ACT

The 11 samples submitted were of various kinds, the liquids comprising distilled water, concentrated detergent, burning oil and emulsion paint, while the solid articles were insulating material, washing powder, soil conditioner, manures and binoculars.

The complaint concerning the **distilled water** was its corrosive effect upon a steam iron, and this possibility was confirmed, since the water contained a trace of sulphuric acid. The **detergent** was reasonably concentrated and was also 'biodegradable', as claimed, which means that it did belong to the class of so-called 'soft' detergents, which break down under normal treatment at sewage works. The original hard stuff resisted treatment and persisted as unsightly foam blankets on Midland rivers.

The **paraffin** sold as a Premium Burning Oil was not so satisfactory. There is a British Standard for fuels which can safely be used in free-standing domestic burners, without a flue. This is based on char value and on smoke point, which is defined as the maximum height of flame at which the paraffin will burn without smoking. Obviously, the highest smoke point is the best, since a fuel which produces black smoke from a relatively small flame is undesirable.

A paraffin which reaches the Class C1 British Standard can officially be described as Premium and for this the smoke point is a flame not less than 35 mm. high. The sample fuel had a comparable flame height of just over 25 mm. and use of the word Premium in the description was therefore criticised, especially as other tests confirmed it was only of the lower Regular grade.

Emulsion paint failed to please the purchaser in respect of its brilliant whiteness but comparison with four other brands, also described as Brilliant White, showed it to be the best in some ways, particularly in its resistence to accelerated ageing tests. Exposure to intense ultra-violet light caused varying degrees of yellow discolouration in the other paints.

A **polystyrene veneer** to insulate interior walls and reduce condensation was claimed to be equivalent in insulation to much thicker veneers, but heat transfer tests proved that this was not entirely justified. **Washing powders** with New Extra Power did show some slight comparative differences from the old blend of enzymes, detergent, soap and whiteners, in that some food stains were more easily soaked from white materials.

The **soil conditioner** was stated to be a unique type of seaweed, with a wealth of trace elements, and a humus content which nourished the soil bacteria. In fact, it contained no humus at all and over 96 per cent consisted of dry mineral matter, mainly chalk, sand and magnesium carbonate. It had traces of nitrogen, phosphorus and potash, the chief fertilising elements, and even smaller traces of iron, copper, cobalt, zinc, manganese and lead.

The **manures** also had low fertilising values, although they were rather better than the soil conditioner in this respect and did have some organic matter to contribute.

Even the **binoculars** would not have helped to magnify the results, since their power was only half that implicit in their description, as "20 x 50". This means that the diameter of the objective lens is 50 mm., which was true, and also that the magnification is times 20, which was not true.

FERTILISERS AND FEEDING STUFFS

The leisurely pace of agriculture has been considerably accelerated of late and the pressure of competition to supply the farmers' feeds and other needs is greater still. Cereals still provide the main bulk of feeding stuffs, whatever the extra ingredients, and the tonnage now being processed into human food is truly tremendous.

If each animal were to be treated as an economic unit in the food chain then, on a 'cost-benefit' analysis, it is probable that only the pig would be allowed to survive, should world cereal production fail to keep pace with population. In terms of efficient conversion of energy and protein from cereals into meat foods (including milk and eggs, from the appropriate animals) pigs head the list, followed by laying hens, broilers, dairy cows, beef cattle and sheep, in that order. In other words, should feeding stuffs become scarce, some types of livestock should really be 'phased out', the economists advise.

Lamb and mutton would be off the menu first, followed by beef, milk etc. Finally the human race would be, perforce, vegetarian, existing on a mixture of processed fattening mash, growth promoters and synthetic protein. This last item is indeed an actuality, being prepared from soya bean and other oilseeds, cereals, leaves, fungi or algae. It is extruded in threads, rather like rayon, to simulate meat fibres and is then known as T.V.P., or Textured Vegetable Protein. In stews, soups, curries or hamburgers, it can take the place of 'real' meat, partly or wholly, and provide equal nourishment at lower cost. Most consumers would, however, have a strong desire to be informed of its presence in the dish, one feels.

Meanwhile, the total value of livestock sales at the British farm gate amounted to £884 million in 1970 and the final cost to the consumer was over £1,800 million. Altogether, for this sum, we ate 4 million cattle, 11½ million sheep and 14½ million pigs. Vegetarianism seems a long way off as yet.

Under the present system, then, feeding stuff samples are still being supplied and examined as in former years. The number submitted under the Act was 186, of which only 4 were unsatisfactory and 16 incorrect. Most of this latter group differed in only a single respect from the manufacturers' statements; in 11 cases the protein had been under-stated and analysis showed the amount to be slightly higher than the upper limit applied, in 4 other samples the oil was in excess and a **Calf Feed** had 4.9 per cent oil (stated 3.0) and 18.9 per cent protein (stated 17.0).

One sample of **Supercreep Pellets**, (which sounds like snake-food but was meant for young pigs) was so different from the stated particulars that it appeared to have been given the label of another product and **Mainfeed Cakettes** was deficient of protein, urea, fibre and magnesium, a really multiple omission.

A brand of **Dairy Nuts**, sampled at the request of a farmer, was found to be low in oil content and a **Pig Meal** deficient of protein, both being prejudicial to the purchaser.

In addition to checking the statement, all of the feed samples are tested for the presence of undeclared urea, certain pig meals are checked for copper content and a salt estimation carried out on most of the poultry foods. The sodium chloride level needs to be carefully controlled at something less than 1.0 per cent, preferably in the region of 0.5 per cent. The 38 results ranged from 0.20 to 0.82 per cent, with a mean value of 0.46 per cent.

Another essential ingredient for egg-laying is a good supply of calcium for the shell and one layers mash bore the rather imprecise claim to contain "sufficient calcium to maintain 80% production". Consultation with the Ministry's Poultry Officer produced the expert opinion that 3 to 5 per cent calcium was sufficient to maintain the maximum likely egg-laying activity, so the actual proportion of 3.5 per cent in the sample seemed reasonable.

Other additives determined were coccidiostats, anti-blackhead agents, arsenic, iron, magnesium and zinc, so a total of 164 estimations were made in addition to the normal analysis.

Fertilisers mainly came in smaller retail packs, on an informal basis, and the number of samples was 62, of which 5 were incorrect in showing small excesses of nitrogen, phosphate or potash over the stated composition. Six samples were judged to be unsatisfactory, 1 because it was in no condition to be analysed at all. When the foil packs were unsealed, the **Plant Food** was found to be a sticky black semi-crystalline mess, almost impossible to scrape out or to sample fairly. It is probable that deterioration had occurred during storage by the seller.

In the case of very concentrated compound fertilisers a special limit is applied to the statement made. This clause in the 1970 Amendment Regulations reads:- "Where the total of the amounts stated exceeds 25%, the amount of all variations taken together, after setting off deficiencies against excesses, shall not exceed 1/20th of the total". Three samples of fertilisers failed to comply with this requirement. One of them, for instance, gave the following results:-

	% stated	% found
Nitrogen	20.0	18.8
Soluble Phosphoric Acid (as P_2O_5)	15.0	13.8
Potash (as K_2O)	20.0	18.9
	55.0	51.5

All the results are within the individual limits applied to each particular claim, but the sum falls below the stated total by 3.5 per cent, whereas 1/20th of the stated total is only 2.75 per cent.

This particular sample was a long job, in fact, as it also claimed trace levels of no less than ten other elements, comprising iron, copper, manganese, molybdenum, boron, zinc, iodine, cobalt, magnesium and calcium. Some of these have methods and limits laid down in the Regulations, but not all. Other additives included the herbicides M.C.P.A. and dichlorprop, whose presence was declared in a Lawn Weed and Feed.

All this information is normally marked "in writing, printing, stencilling or in any other appropriate manner" as required, on the outside of the container and is therefore visible before purchase, but the Regulations also

sanction the placing of a marked label **inside** the parcel, when it consists of a single package. This course was adopted by the packers of a **Soluble Plant Food**; the required statement concerning magnesium, iron and manganese contents was discovered on a very small slip of paper enclosed within the sealed carton.

A total of 62 additive determinations were made on the 62 fertilisers, more unevenly distributed than the average suggests. Some of the applications now made to the soil are very complex: in the past the farmer's boot was traditionally the best fertiliser, presumably as it carried his observant eye over the acres, but shoe leather was never like this. At its best, agricultural science can determine and remedy all the deficiencies of a particular soil, in respect of its essential elements, but excesses of unwanted elements are harder to remedy, and blanket additions of many trace chemicals, regardless of special needs, are of very doubtful value.

WATERS AND SEWAGES

The Laboratory renders a basically essential unsung service to 31 of the 36 District Councils within the County, by the regular analysis of their water supplies or the outflows from their sewage works; 15 of the Authorities submit both types of samples and there are 5 who send in neither, although 2 of these have their own chemist. Districts with access to the Bristol Channel have no sewage works to sample at the present time, although a number are under construction.

The regularly-programmed samples totalled 744 and the extra emergencies or problems provided a further 363 samples, making 1,107 in all.

As regards its drinking water supply, the County is efficiently covered by 2 Water Boards and 1 Waterworks Company, well-equipped to make all routine checks. There are a number of occasions, however, when the examinations made by an independent Laboratory, with a wide experience of many other chemical disciplines, have been of benefit to supplier and to householder.

The consumer is only concerned about the quality of the water as it comes from his own tap and not as it leaves the Water Board's reservoir. Water comes in infinite varieties itself and plumbing systems also differ, particularly in older properties, where the pipe-work may be a unique creation, so all premises have their own problems.

Assessment and advice were therefore given regarding 131 special samples, in addition to routine checks on supplies. For these the Laboratory records of previous analyses show if any significant change has taken place.

The wise precaution of submitting water for chemical analysis is taken by many of the rural Authorities when improvement grants are requested. The local spring or the well at the bottom of the garden may have a horrible effect upon new copper piping or galvanised tanks and it is much better to know this in advance, although this is a chargeable service.

One borehole water, serving a farm in Wells Rural District, was not recommended for use since it was incredibly hard. A water is reported to be very hard when the figure, expressed as calcium carbonate, exceeds 300 parts per million. This water had a hardness of over 1,800 parts per million, mainly due to sulphates, in this case, which does have several disadvantages. Drinking it would be equivalent to taking a dilute dose of salts, hot water systems would become scaled or furred and it would be almost impossible to raise a lather with soap. The World Health Organisation apply a maximum limit of 400 parts per million of sulphate; above this level "slight gastro-intestinal upset could possibly be experienced by those unaccustomed to drinking such a water". The farm borehole had almost four times this maximum amount.

An even harder water came from a house in Williton Rural District, later in the year, from a possible purchaser—another service rendered—and the same comments were made.

Corrosion problems are numerous, one of them involving the drinking fountains in the newest Block of County Hall. This trouble commenced in the previous year, with attack on copper and zinc in the piping, and the system eventually had to be re-plumbed in plastic. Apart from this, some 61 other samples were examined, from premises all over the County—new and old homes, offices, hostels and holiday camps. Special analyses included a detailed examination of water to be used in a kidney machine and estimation of calcium in a supply to be used for a child on a special diet.

Animals also registered their complaints, in a sense, and waters were analysed from a stream where cattle would not drink, a pond upon which the ducks refused to swim and a tank containing 40 dead goldfish. The death of trout in a lake was also investigated and advice given upon stocking another pool in which eels were known to thrive, but more sensitive species would probably not tolerate.

Brown deposits in waters are mostly due to the presence of iron. Heavy amounts are most undesirable in a drinking water and usually mean that ancient iron mains must be replaced, an expensive undertaking nowadays. Iron plus pollution in a stream can give rise to unsightly and malodorous trails of slimy 'sewage fungus'. Even school swimming pools are not free from iron troubles; severe attack upon supply pipes had been progressing during the holidays in one pool and a very heavy dark-brown deposit resulted. Assuming the sample sent for analysis represented the whole of the water, then the large pool of 80,000 gallon capacity contained about 8 pounds weight of iron, plus zinc and copper salts. Many other swimming pool waters were checked, for quality and safety.

Two wastes from the Mid-Somerset area contained chromium in one case and a large amount of titanium in the other. This latter sample came from a ditch, in fact, which was being blocked by grayish-white deposit. Titanium dioxide has wide industrial usage, particularly in white house-paints and enamels, but also in ceramics, plastics, paper 'fillers' and leather finishes.

Leakage waters on domestic premises are often an anxiety. The percolate through a boundary wall at Weston-super-Mare was found by analysis to be identical with mains water, but the water from a flooded cellar in the same Borough was polluted with sewage, and liquid from a basement in another town actually was sewage, and fairly strong at that; immediate steps were taken.

The thing which upsets the operation of most sewage disposal works is to receive large quantities of oil in the crude intake. It rises when it should settle, clogs up the filters and is not broken down by biological action, like other waste matters. The 'tar' received at one works was found to be a heavy fuel oil, known as '200 sec'. Oil undoubtedly caused trouble at a second works, but the culprit could not be identified.

Analysis using infra-red and gas chromatography techniques confirmed the nature of the suspect motor oil contaminating a stream, for the Devon River Authority. Mineral or fuel oil is almost always to blame, but another incident at a works produced the surprising finding that the contaminant was actually cooking oil. After separation from the sewage, distinctive odours of fried fish and chicken could be detected. This time the origin was not a garage but a works canteen, where volumes of old oil had been poured down the drains, a practice to avoid.

Pollution of a different kind, on a much bigger scale, was the reason for examining waters and shore deposits from the Bristol Channel. Release of wastes from steel industries on the Welsh coast, containing iron, ammonia, cyanide and phenols, was being debated at the time. Some metals were determined but the chief concerns were the cyanide (never detected) and the phenols (occasionally found in trace).

Rain on the Mendips provided another regular set of samples each month, in a survey requested by the County Planning Officer, to estimate the amount of atmospheric dust due to quarrying operations and its influence upon health or amenity in this attractive area. The rain-collected matter at each of 12 sites is measured and analysed, with particular reference to the calcium content, from the limestone dust.

Country rain-water is really quite pure, but distilled water should be purer still. The customer of a garage complained of the quality of distilled water supplied and the manager sent some for analysis. It was found to be strongly acidic, with a high chloride content and the same solid content as a hard water, so the customer is still right, occasionally.

MISCELLANEOUS SAMPLES

In the year 1961, a total of 272 samples was reported under this heading; ten years later, the number has risen to 1,662, a very considerable increase.

Waters and their deposits have already been reported. Almost a third of the total were specimens from doctors and hospitals in the County, the

majority being **blood sera** from mental patients for checks on the level of lithium, used in a form of therapy. A level of 1.0 milli-equivalents lithium per litre is desirable, but 2.0 mEq/L is excessive, so regular determinations must be made, for complete control. Bloods, urines and other specimens were also examined for constituents as various as arsenic, cannabis, copper, heroin, magnesium, metaldehyde and sugar.

Foodstuffs are sometimes analysed for special reasons outside the normal functioning of the Food and Drugs Act. A large number come from the Education Department, for instance, in connection with the supplies for **School Meals.** This year 101 samples were analysed, covering 21 different products, from the staples like flour, fats, dried vegetables and sausages to the trimmings such as cochineal and custard powder.

Occasionally, chargeable work is done to assist manufacturers in the County, such as certifying natural **cheeses** for export to Japan, checking the efficiency of the plant pasteurising **liquid egg,** or confirming fermentation in **frozen cherries.**

Other samples may come from inspectors following up a particular complaint or suspicion; these included **ginger biscuits,** to prove that the two found joined by a piece of string were really from the manufacturer claimed, a **baby food** to check if the flavour of the product could normally be described as 'soapy' and no less than 26 samples of prepacked **ground almonds.** These followed a complaint packet found to be in a bad state and meant the individual inspection of 1,313 nuts. Only 808½ were passed as entirely satisfactory and 219 were pock-marked, grub-holed, or otherwise out of condition, the others being too poor to pass but too good to condemn.

Some are bought for experimental purposes in the Laboratory, when new methods are being investigated, such as the identification of **white fish** by electrophoresis. Cod, plaice, whiting, haddock and scampi were examined in this way.

Two other **fish** came in for a different reason; plaice and sole had been caught in the Bristol Channel by a local fisherman who packed his deep freeze with the net results, for winter use. He had become concerned after reading accounts of marine pollution and wanted the fish tested for mercury, but little or no mercury, and only a trace of cadmium, was detected.

Chips rather naturally follow fish, and these were examined for excess preservative. A certain product was available in the trade which was claimed to prevent the darkening effect shown when certain raw fruits and vegetables are exposed to the air after cutting. Every housewife knows that apples, potatoes and bananas rapidly become brown after peeling and slicing, due to the action of a natural oxidising enzyme upon the tannin-type compounds also present. This action can be arrested by adding lemon juice, when appropriate, or heating without delay or treating with a solution containing sulphur dioxide, the preservative present in Campden tablets. This was also, in fact, the active constituent of the mystery preparation for keeping raw chips white. Samples of the chips, soaked as directed, did contain more than the legal limit of 50 parts per million sulphur dioxide, unfortunately, and were criticised for this reason.

A consignment of **orange peel** from Israel was also checked for sulphite, on arrival at the port of Bridgwater, and found to be within the statutory limit. Imports of **tomato puree** were proved to be of satisfactory concentration and free from metallic contaminants.

One investigation concerned the presence of added nitrates and nitrites in **canned meats** and various brands of corned beef, luncheon meat, chopped ham and pork in natural juice were examined for these preservatives alone; most contained very little, but some had surprisingly high amounts. Samples of **bacon**, necessarily cured with nitrate, were also analysed. A fairly high zinc level in a piece of **veal**, sent on complaint, aroused suspicion, but veal bought for comparison contained much the same amount of zinc, apparently natural in origin.

A string of **sweets** in the form of coloured beads caused some concern when the presence of a prohibited dye was suspected in the blue ones. Correspondence with the makers, and the supplier of their colouring matters, together with much more paper-chromatography work, eventually showed that a permitted colour was used, but this had a low stability and decomposed to other compounds rather too easily on keeping.

Some semi-medicinal sweets were flavoured with menthol, aniseed, cinnamon, peppermint and eucalyptus, which failed to appeal to at least one palate, but Laboratory tasters and testers found no real fault with the sample.

Two dried leaves from a can of tomatoes could not positively be identified as **basil**, which was claimed, but a sample confirmed as dried **tea** leaves was free from suspected arsenic and no chicory or fig constituents could be detected in a product sold as fresh **coffee**.

Cream can be made from the traces of fat remaining in whey, but this tends to be acidic and one bulk was being stored in metal tanks for a period, so the creams were examined for trace metals from the tanks; only minute traces were detected. Some **milks** were analysed, mainly at the request of producers, **water ices** tested for acidity and two **ice-creams** examined because the health inspector thought they were being diluted and re-frozen.

The majority of the other miscellaneous samples, totalling 289, were decidedly not eatable. **Sewage effluents** and a **trade waste** were monitored during the year for pesticides, as they have been ever since the original incident of 1965, when unchecked release of these chemicals into a river killed many fish. After a long series of negative results traces of some pesticide compounds were found in the November samples. The firm were very concerned and suggested that it could be due to recent demolition of parts of the old factory. Rainwater washing through the possibly-contaminated rubble into surface drains just might be the cause and, since no further traces appeared in the waste, this was accepted.

A survey of the whole **river** was undertaken at the end of November, with the help of the four riparian authorities, who collaborated by taking a series of samples along the river, from just below the source to its confluence with a larger river.

Apart from registering the expected deterioration in organic purity, as the result of receiving two major sewage outfalls, many minor discharges and the run-off from acres of agricultural land, the river water showed interesting variations of metal levels, especially zinc, copper and iron. Chromium, cadmium and manganese were not detected. Traces of the pesticides B.H.C. and D.D.T. were occasionally present.

Pesticides were also sought in 10 **river waters** and 2 sewage effluents submitted by another River Authority and ten of the dozen samples gave positive results, although the proportions were all extremely low.

Specimens of **air** were specially tested from places as far apart as the centre of a town in east Somerset, the environs of a market garden in the west and the computer room at County Hall; the last one was merely a matter of checking the temperature-recorder in situ. The first of the exercises involved measuring the level of carbon monoxide derived from car exhaust fumes, and the other air sample contained a ripe manurial odour, experienced by local residents at the time of the annual muck-spreading. This ancient fertility rite has no measurably ill effect upon health, however.

Chemical means of controlling algae, germs and weeds provided four samples from other County Departments, which all resulted in advice **not** to purchase the commodity. The **algicide** was sold for use in Museum aquaria, with the claim that it was harmless to fish, but the chief constituent proved to be copper sulphate, which is poisonous to some varieties of fish in very low concentrations. As little at 0.03 part per million of copper in the water will kill sticklebacks kept in it for 3 or 4 days and 1.0 part per million is lethal to bigger fish, such as trout. This algicide was not recommended, therefore.

The makers of a certain **germicidal preparation**, to be used as a hygienic swab rendering telephones non-infective, sent in a trial sample. It was reported that this was a very weak solution, containing only 0.3 per cent solid matter. The firm said that a mistake had been made and they would submit a concentrated version instead; this was hardly borne out by the facts, since the total solids were still well below 1.0 per cent. Since bacteriological opinion also doubted its usefulness, no purchase was made.

The **herbicide** had already been used to spray a school playing field with a heavy growth of speedwell, but the speedwell continued to thrive and the groundsman was not satisfied. Analysis and enquiry showed that the wrong preparation was being used. Ioxynil is the compound which causes speedwell to wither away and this was included in a certain proprietary product, but the firm also manufactured another herbicide of very similar name and this had been used in error. More easily-distinguished titles would appear desirable.

Lichens are one of those forms of plant life, like moulds, which are welcome in one context, and a decided nuisance in others. Mellow stone roof tiles may benefit in appearance, but continued growth on outer walls which are normally painted means a rough and unsightly surface. A dozen samples were received from one rural authority having this kind of trouble on a council estate. Very little difference could be seen after treating with a

(?) lichicide containing salts of mercury, but closer microscopic examination of the treated specimens of lichen did show that slow death was taking place and untreated patches continued their snails-pace growth, accelerated by incubation. Makers of the mercurial treatment confirmed that it took at least 24 hours for any action, and then the lichens must be scraped off the wall and a second preventative dose given before re-painting.

A **lead paint** was checked for the County Architect and the brown metallic lead primer found to have the correct lead content, calculated from the complex specification. A rather older sample was a few grams of metal from a **lead sheet** found at an archaelogical site in the County, examined for the presence of copper, silver, tin and antimony.

Metals were also concerned in the death of grass on a new school playing field. The area of the Mendips is particularly rich in lead and other minerals and has been mined since pre-Roman days, so the ground has suffered considerable disturbance for centuries past. Abnormal die-off of sown grass occurred on the site over an area of 100 yards by 30 yards and samples of **soil** were sent for analysis. Digging for calamine, an ore of zinc, was known to have been a local industry, so search was made for zinc, among other metals, and it was found to be present in very high concentration, along with lead and iron. Apparently healthy patches of the school grounds had a total zinc in soil of less than 1 per cent, but the worst areas gave figures rising to almost 5 per cent.

The solubility of the zinc was the important factor, in its effect upon plant growth, and grass will not do well when the soluble zinc exceeds 100 parts per million; in this soil the level was 5,000 parts per million, in places. It was advised that a 6-inch layer of fresh top soil would be the only cure.

Soil from a private garden was examined for another possible cause of infertility—the blow-over from a neighbour's weedkiller—but this could not be confirmed and a healthy crop of mustard and cress was raised in the Laboratory to prove it. Another soil came from a service station, where it was proposed to instal a new underground petrol tank, to be tested for possible corrosive action.

A new departure was provided by old **petrol tanks,** at garages, no longer required and due to be either carved up or filled with concrete, according to their location. A considerable hazard obviously exists if any highly-inflammable petrol vapour still remains in the tank and some official certificate must be issued that the tank is safely empty, before demolition can proceed. A sensitive detector called an explosimeter, can be used to check that the air inside the tank is well within explosion limits. This usually means that the boiler-suited analyst must squeeze down rather small holes and crawl around inside the tank. During the year 19 tanks were checked, in this way, at Taunton, Dunster, Williton, Yeovil, Bishops Lydeard, Norton Fitzwarren and Sidmouth, the fee being £5 per tank, plus travel expenses.

Still in the fuel field, facts on **paraffins** were collected on samples supplied by the Chief Inspector of Weights and Measures in connection with a complaint under the Trade Descriptions Act. Some **diesel oil** was examined for a farmer whose new tractor had broken down, rather to discount the supplier's suggestion that contaminated oil was to blame; the oil was, in fact, entirely normal.

Some light-weight **trousers** which had split after only four wearings were examined for possible action under the Trade Descriptions Act and **firemen's over-trousers** or, rather, the materials themselves, before tailoring, were tested for flammability in accordance with the appropriate British Standard specifications. This involves hanging strips of the yellow proofed material in a draught-free enclosure and applying a measured flame for a measured time to the bottom end of the measured strip. In the standard twelve-second test, the best material did not actually ignite, but merely melted and charred for a short distance and, under more severe conditions, the burning matter was rapidly self-extinguished. The worst material flared up violently after only three seconds, and burning blobs continued to fall until the strip was entirely consumed. These were not recommended.

Foam compound used by the Somerset Fire Brigade to extinguish fires was checked for satisfactory composition, following an occasion last year when one such product turned out to be a supply of pink soapy water.

The College of Art sent in a sample of **clay** which had caused many small imperfections and pock-marks in terracotta pots, after firing. If the damp clay is carelessly scraped from the plaster table on which it is worked, then small fragments of calcium sulphate are later incorporated in the whole mass and decompose in the red-hot kiln, giving spots of lime and bubbles of gas. Alternatively, the supply of clay had been impure to begin with; but analysis showed that the flecks did consist of plaster and the first theory was correct.

Dust and **slags** were analysed for fluorine content, in connection with materials used for motorway construction, concreted **clinker** from a sewage works was examined and a **pH meter** checked for the County Health Inspector, who also submitted a **veterinary drug**, for injection into a cow's udder, asking if this might interfere with the test for antibiotics carried out on the cow's milk. The answer appeared to be in the negative.

A number of the eleven **Cattle Cakes** were received on complaint, following falls in milk yield. In most cases, the analysis showed the composition to be reasonably correct but the complaint was found to be fully justified on one occasion. The feed was sent to the Laboratory in a polythene bag labelled "Please sample this cake as cows will not eat it. It has made them quite sick and seems to be very salty". The cake had only 13.4 per cent protein, against the stated 16.0 per cent and contained over 7 per cent of salt, a considerable excess. The normal level was around 2 per cent, confirmed on a comparison sample labelled "This cake seems perfectly alright".

A vet suspected another dairy herd to be suffering from hypomagnesaemia, or deficiency of magnesium in the diet, in spite of the fact that they were on a special feed supplemented with this necessary element. The feed was stated to contain 56 lbs. of magnesium oxide to the ton, but analysis showed that only half this amount was actually present. This happened in January; a further case of magnesium deficiency was diagnosed in the herd at the end of July and feed from the same suppliers was again found to be low in magnesium, containing only 31.4 lbs. of the oxide per ton.

A real cake for cattle was examined, on an experimental basis, in October. Just 30 lbs. in one solid circular slab, it was intended for consumption by licking in the open field rather than chewing in the stall, guaranteed to be a weather-proof mixture of grain, calcium ligno-sulphonate, barley, salt, dolomite and various minerals. A brace and bit was the sampling tool of choice and trial holes were drilled in various quadrants to determine the evenness of distribution of the ingredients. They did seem to be very uniform.

Checks on a **Chick Feed** showed it to be quite satisfactory and not likely to be the cause of low egg production. One very odd fowl was received, a so-called **Crazy Drinking Bird,** which was actually a sort of adult toy from foreign parts. The main body of the creature was a glass tube and bulb, suitably feathered and partly filled with a pink mobile liquid. This was joined to a red plastic head and pivoted at a central point on a stand representing the legs and feet. When the beak was dipped into a glass of water, vapourisation of the volatile fluid inside the bird caused him to go up and down like a see-saw. "Once he starts drinking he won't stop" claimed the jolly label, followed by the not-so-jolly warning "DANGER. Contents may be fatal or cause blindness if swallowed. NON-INFLAMMABLE but over-heating may cause the body to burst. Keep from heat or flame and from reach of children."

The mother of a handicapped child had bought one of these toys without realising its unsuitability and she took it to her Medical Officer, who sent it on to the Home Office. From there it was returned to the Medical Officer, with a request that the liquid contents be analysed. They were here found to consist of methyl chloride, which is normally a toxic and inflammable gas, stored in a pressure cylinder and kept in the refrigerator. The Safety Sheet supplied with it states: "Methyl Chloride is a dangerous anaesthetic and narcotic. It is absorbed quickly but eliminated slowly ... Severe exposure may affect liver, kidneys and blood tissue". It should be added that the glass bulb holding this rather unpleasant chemical was extremely thin and fractured with great ease when the contents were released for analysis. The reaction of the Home Office is not known at this time.

Two of the three mysterious **white powders** listed had strong family connections, since they both came from China and were also found inside toys—children's piggy-banks, in fact, (although one was actually a bull-bank). The first was submitted in January and analysis showed the plastic bag discovered in the animal's interior to contain a mixture of soap powder and synthetic detergent. A precisely similar powder was discovered in

a Hong Kong import during the next month and this time was first sent to the police as a possible narcotic. This addition, however harmless, remained slightly mysterious; theories ranged from an attempt to clean up the filthy lucre to the advance publicity of a Chinese laundry. The other white powder had fallen off an over-turned lorry and was suspected to be cyanide, but a rush analysis showed it to be non-toxic calcium chloride.

Another parent was concerned about the possibly harmful effects of a form of **Christmas tree decoration**. This was a packet of silky white fibres, which could be spread around the tree to resemble snow, it said, although it actually looked more like Father Christmas's beard. It was made from finely-spun glass, in fact, and detached bits could float around the room. A specialist from the Medical Research Council was of opinion that the fibres were much too large to be actually inhaled and so damage the respiratory passages, but confirmed their irritant effect on the skin and expressed sympathy with the parents if fragments should get into the baby's nappies.

Glass cups were examined for causes of breakage and pottery **cups** tested for paraffin odour (which was not detected); a **plastic beaker** showed signs of past usage, with souring residues, before being re-filled with tea and served to the complainant, who did not like the taste.

Two **deodorant sprays** for atmospheric use were claimed to kill offensive smells and delicately perfume the air, but their bacterial action was thought to be very low; one used at a meat factory had no adverse effect on garden plants, as suspected, however. A **deposit** in urinals was a solid mass of abrasive cleaning powder and the corrosion of a **wash-basin trap** at a Day Nursery due to excessive use of harsh cleaners and bleach, acting on the high zinc alloy. Tests on the neutralisation of mixed acid and **lime wastes** were made for a disposal contractor.

An **insect** in an office was identified as a 'fire-brat' and estimation of the warfarin content of **rat baits** was carried out in connection with the sudden death of a farm dog; the levels were as stated and so low that they certainly should not have affected canines.

During the year, various specimens from **dead dogs** were submitted, in cases where poisoning was a possibility, but most gave negative results. One collie was known to have eaten part of a dead hare she found in a field, before suffering from vomiting and diarrhoea and dying only 1½ hours later; a positive reaction for strychnine was obtained on these specimens.

Finally, a most important exercise was commenced in December 1971, relating to the **pollution of the Somerset coastline by heavy metals,** known to be present in the Bristol Channel, largely from industrial sources. Very great activity in this area has taken place since then, and many analyses have been made, in this and other Laboratories, but the first findings mirror the significance of the whole.

In brief, it was decided to select a certain type of marine crustacean and measure its metals, along the 70 miles of coastline from Porlock in the west to Portishead at the eastern end. The crustacean of choice was limpets,

(which were present in fair profusion at that time), an interesting shore creature with a pronounced homing instinct, which establishes its base on a certain boulder and browses over it between tides. Limpets appear to change their sex during life, starting as males and finishing as females and, like other shellfish, are known to build up traces of metals from the surrounding mud or water in their own tissues.

The first dozen samples along the coast showed some interesting features. The arsenic contents all exceeded the food maximum of 1.0 part per million, for one thing, although edible shellfish are specifically excluded from these Regulations. Limpets are usually regarded as now-edible in most cases, although André Simon's Food Guide states that they are "of real gastronomic merit; in many dishes in which cooked oysters appear they could easily and advantageously be replaced by limpets".

There is actually a history of limpet-eating among the older inhabitants of the coastal villages, as evidenced by heaps of shells in some cottage gardens, but, fortunately perhaps, local tastes appear to have changed.

Lead, copper and mercury were always present in the shellfish, although not in excessive amounts, but zinc and, especially, cadmium were found in very high proportion. Cadmium is a toxic metal used in the form of plating alloys for many industrial purposes and normally occurring in nature with ores of zinc. The cadmium contents of the Somerset limpets showed an almost perfect ascending gradient, from 11.5 parts per million at Porlock to 118.5 parts per million just below the zinc smelters of Avonmouth.

It appeared desirable to proceed with this project and samples now analysed include winkles, mussels, whelks, crabs, shrimps and many species of white fish caught in channel waters, besides the actual sea water, weeds, muds and rocks.

BOROUGH OF WESTON-SUPER-MARE

A total of 147 samples was submitted for analysis by the Chief Public Health Inspector during the year, comprising 3 formal and 144 informal samples, of which 4 were reported to be unsatisfactory. In addition, 6 private samples were received on complaint, which have already been included in this Report.

The four samples not passed as genuine were pre-packed meat, beet and meat substitute. A can of **Roast Pork with Rich Gravy** was found to contain 69.6 per cent meat, lower than the required 75 per cent, although the title could have been modified by adding the word 'Sliced'. A minimal 60 per cent meat would then have satisfied the complex requirements of the Canned Meat Regulations. The gambit of the packers, now an off-shoot of a large firm noted for their dog-biscuits, was to say, quite correctly, that addition of 12½ per cent stuffing to their product would qualify them for an even lower standard, of 50 per cent meat. They did also state, however, that they intended to retain a meat content in the region of 70 per cent.

A can of **Ham** had a rather similar labelling-cum-composition deficiency. Like one of the County samples, the addition of the words "In Natural Juices, Gelatine added" to the title would have covered a multitude of jelly; without them the official requirement is 90 per cent meat. This sample had no more than 76.4 per cent meat and was therefore unsatisfactory.

The bottled Dutch **Beetroot** had two rather contradictory labels, one declaring saccharin and the other omitting it, and neither carried the necessary name and address of the packer or importer. The sample was found to be old stock.

One of the canned articles causing criticism was actually nuts. A **Meatless Luncheon Roll**, which could be extruded from the can as a solid gray-brown cylinder of processed peanuts and cashew-nuts, was rather flatteringly illustrated on the label, in a way that would have attracted carnivores as well as vegetarians. The word 'Meatless' was far less conspicuous, and it was suggested that improvement could be made when the label was re-printed.

LABORATORY FEES

The fees received during the year ended 31st December, 1971 amounted to £1,478.16. This figure includes charges of £600 to the Borough of Weston-super-Mare and £310 to the Education Department for school meals.

TABLE 1

SUMMARY OF SAMPLES ANALYSED DURING 1971

Somerset County Council

Food and Drugs Act			2,537
(a) Formal	1,306		
(b) Informal	1,078		
(c) Appeals-to-Cow	25		
(d) Private	128		
Trade Descriptions Act			11
Consumer Protection Act			6
Road Safety Act			34
Fertilisers and Feeding Stuffs Act			474
(a) Fertilisers	62		
(b) Feeding Stuffs	186		
(c) Additive Determinations	226		
Milk and Creams for Penicillin Test			393
Waters and Sewages			744
Miscellaneous Samples			1,272

Borough of Weston-super-Mare

Food and Drugs Act		153
(a) Formal	3	
(b) Informal	144	
(c) Private	6	
GRAND TOTAL		5,624

TABLE II

COUNTY FOOD AND DRUG SAMPLES (excluding Private Samples)

Article	Number examined	Number adulterated or incorrect
Alcoholic Drinks	13	–
Baby Food	4	–
Baking Powder	5	2
Bread, Biscuits and Cakes	44	1
Butter	23	1
Cake and Pudding Mixes	11	–
Cereal Products	21	2
Cheese and Processed Cheese	59	2
Cocoa and Drinking Chocolate	7	–
Coffee and Coffee Products	34	1
Condiments and Spices	20	–
Cream	30	–
Dried Fruit	31	7
Fish and Fish Products	52	1
Flavourings and Colourings	9	1
Food Drinks	20	1
Fruit and Fruit Juices	51	–
Herbs	3	–
Honey	6	1
Ice Cream	13	–
Jellies and Gelatine	26	1
Margarine	16	–
Meat and Fish Pastes	16	1
Meat Products (canned)	52	3
Meat Products (open)	44	2
Milk, Ordinary	745	24
Milk, Channel Islands	441	–
Milk Products	31	3
Mincemeat	9	–
Nut Products	3	–
Oils and Fats	19	1
Pickles and Sauces	11	–
Preserves	45	1
Puddings	21	2
Salad Dressings	12	1
Sausages, Beef	24	1
Sausages, Pork	48	1
Shredded Suet	1	–
Soft Drinks, concentrated	36	4
Soft Drinks, ready-to-drink	50	3
Sugar and Sugar Products	9	1
Sweets and Chocolates	28	–
Tea	26	–
Vegetables (canned etc)	18	1
Miscellaneous	6	–
Drugs	191	5
TOTALS	2,384	75

TABLE III

TOTAL PRIVATE SAMPLES

Article	Number examined	Number unsatisfactory
Alcoholic Drinks	1	–
Baby Food	1	–
Blackcurrant Health Drink	1	1
Bread, Biscuits and Cakes	23	23
Butter	4	2
Cake and Pudding Mixes	1	1
Cereals	3	3
Cheese and Processed Cheese	2	1
Coffee and Coffee Products	1	–
Cream	8	2
Fish Products	8	4
Fruit and Fruit Juices	13	5
Honey	2	1
Ice Cream	1	–
Ice Lollypops	1	–
Margarine	2	–
Meat Products (canned)	11	10
Meat Products (open)	7	4
Milk, Channel Islands	1	1
Milk, Ordinary	17	14
Milk Products	2	2
Nut Products	1	1
Pickles and Sauces	2	1
Preserves	3	2
Puff Pastry	1	1
Puddings	1	–
Salad Dressings	1	–
Sausages, Pork	1	1
Soft Drinks, ready-to-drink	3	2
Sweets and Chocolates	5	3
Sugar	1	1
Vegetables	4	3
Vinegar	1	–
TOTALS	134	89

TABLE IV

UNSATISFACTORY FOOD AND DRUGS

No.	Article	Result of Analysis
4	Sugarless Jelly	Claim that product is of negligible carbohydrate value not thought to be justified.
357	Cod Liver Oil Ointment	Deficient of Vitamin A, when calculated from formula stated.
364	Beef Dripping	Acidity exceeded 1.5 per cent equivalent of free fatty acids.
520	Dates	Contained 2 complete insects and other insect fragments.
820	Cheddar Cheese	Contained 40.2 per cent moisture. Sample actually resembled a processed cheese.
910	Shandy	Contained only 1.0 per cent proof spirit, instead of at least 1.5 per cent.
933	Apricots (dried)	Contained 2,160 parts per million sulphur dioxide preservative.
1035	Blackcurrant Drink	Contained slight excess of saccharin and was 1.7 per cent deficient of added sugar.
1039	Cornish Cream and Honey Spread	Should be described as "Cornish Spread with Honey and Cream."
1298	Finest Malaga Muscatel Raisins and Almonds	Raisins considered to be too small for description as the finest quality. Name and address of packer on label too inconspicuous to satisfy Labelling Regulations.
1376	Pasties	Should be described as "Meat and Vegetable Pies."
1644	Barbitone Sodium Tablets	Labelled by chemist as 0.5 gram tablets; found to be 0.3 gram tablets.
1653	Toilet Soap	Quantitative statement of proportion of hexachlorophene should be made on label.

No.	Article	Result of Analysis
1666	Viennois Chocolat (Prepacked dessert)	Labelling should be in English and easier to read.
1667	Viennoise Peche (Prepacked dessert)	Labelling should be in English and easier to read.
1840	Devilled Ham Paste	Contained not more than 58.8 per cent total meat; must now contain a minimum of 70 per cent meat.
2137	Butter Shortcake Biscuits	Only half the fat present consisted of butter, with no disclaimer on label.
2153	Baking Powder	Contained only 3.54 per cent available carbon dioxide; minimum content must be 8 per cent.
2281	Orange Marmalade	Deficient of soluble solids content.
2379	Evaporated Apricots	Infested with living mites.
2385	Cherry Drink	Quantitative claims should be made for minerals claimed to be present.
2394	Mixed Dried Fruit	Infested with living mites.
2555	Blackcurrant Drink (F)	Contained slight excess of saccharin and was 1.65 per cent deficient of added sugar.
2569	Shandy	Contained only 1.25 per cent proof spirit; should contain not less than 1.5 per cent.
2698	Instant Milk Shake	Little English labelling on this foreign product; no list of ingredients given.
2885	Drug containing vitamins and minerals	In unsatisfactory condition, major portion of metallic ingredients having precipitated.
2907	Salad Cream for Low Salt Diets	Contained only 20.7 per cent oil.
2916	Low Calorie Blackcurrant Drink	Contained 0.545 per cent cyclamic acid.
2923	Apricot Yoghourt	No declaration of ingredients on label.
3042	Baking Powder (F)	Contained only 2.72 per cent available carbon dioxide.

No.	Article	Result of Analysis
3054	Ham (canned)	Meat content not more than 82.7 per cent.
3201	Pork & Beef (sausages)	Label did not carry full description of product.
3313	Tuna Steak (canned)	Contained 0.7 part per million mercury.
3330	Super Concentrated Low Calorie Apple Squash	Contained 0.62 per cent cyclamic acid.
3337	Chocolate Flavoured Food Drink	Fact that this product contains 40 per cent added sucrose not indicated by description.
3870	Instant Coffee	Word "decaffeinated" should appear in main description of this sample.
3996	Honey & Yeast Tablets	Energy and protein claims not justifiable.
4318	Sun Dried Apricots	Living mites present.
4324	Honey	High content of hydroxymethyl-furfural.
4328	Instant Low Fat Skimmed Milk	Contained 5.5 per cent water.
4452	Brazil Nut & Raisin Yoghurt	Brazil nuts and raisins should not be described as "fruit" in list of ingredients on label.
4456	Cheese blended with Port	Mould growth present.
4459	Biscuits	Claim to contain butter not justified by amount present.
4463	Plain Flour	Contained only 133 mg. chalk per 100 grams.
4499	Meat Pasties	Deficient of required 25 per cent minimum meat content.
4794	Ham & Chicken Roll (canned)	Contained nitrate equivalent to 970 parts per million sodium nitrate.
4870	Pork Sausages (F)	Contained not more than 59.6 per cent meat.

No.	Article	Result of Analysis
4882	Spinach Puree (canned)	Contained 5.2 parts per million lead.
4970	Plain Flour	Contained only 132 mg. chalk per 100 grams.
5070	Fancy Izmir Figs	Living mites present.
5132	Ham & Chicken Roll (canned) (F)	Contained nitrate equivalent to 1,230 parts per million sodium nitrate.

(F) = Formal

TABLE V

WESTON-SUPER-MARE FOOD AND DRUG SAMPLES

(excluding Private Samples)

Article	Number examined	Number adulterated or incorrect
FOODS		
Alcoholic Drinks	3	–
Artificial Sweeteners	1	–
Baby Food	4	–
Bread, Biscuits and Cakes	5	–
Butter	6	–
Cake and Pudding Mixes	1	–
Cereals	5	–
Cheese	2	–
Cocoa and Drinking Chocolate	1	–
Cream	5	–
Fish Products	4	–
Flavourings and Colourings	1	–
Fruit and Fruit Juices	10	–
Herbs	1	–
Honey	2	–
Jelly	1	–
Margarine	3	–
Meat and Fish Pastes	3	–
Meat Products (canned)	19	2
Meat Products (open)	4	–
Milk	8	–
Milk Products	6	–
Mincemeat	1	–
Nut Products	2	1
Oils and Fats	3	–
Pickles and Sauces	8	1
Preserves	6	–
Puddings	5	–
Sausages, Pork	7	–
Sausages, Beef	1	–
Shandy	1	–
Shredded Suet	1	–
Soft Drinks, concentrated	2	–
Soft Drinks, ready-to-drink	1	–
Soup	1	–
Sugar and Sugar Products	2	–
Vegetables	4	–
Vinegar	1	–
Miscellaneous	3	–
DRUGS		
Aspirin	1	–
Blackcurrant Health Drink	1	–
Rose Hip Syrup	1	–
TOTALS	147	4

TABLE VI

FEEDING STUFFS

Article	Total Number	Number Incorrect	Number Unsatisfactory
Sow Nuts	4	1	–
Sow and Weaner Meal	12	–	–
Weaning and Rearing Meal	11	1	–
Breeders Nuts	12	1	–
Fattening Meal	4	–	–
Bacon Finisher Meal	6	–	1
Porker Meal	5	–	–
Sowmilk Replacer	4	1	–
Creep Pellets	4	2	1
Chick Mash	7	–	–
Growers Mash	8	1	–
Layers Mash	21	1	–
Poultry Pellets	5	–	–
Turkey Feeds	4	1	–
Milk Meal	8	–	–
Dairy Nuts	26	2	1
Calf Feeds	16	3	–
Beef Fattening Nuts	10	–	1
Cereal Nuts	4	1	–
Grazing Nuts	2	–	–
Sheep and Lamb Feeds	4	1	–
Other Feeds	9	–	–
TOTALS ..	186	16	4

TABLE VII

FERTILISERS

Article	Total Number	Number Incorrect	Number Unsatisfactory
Ammonium Nitrate	1	–	–
Bone Meal	1	–	–
Carnation Fertiliser	1	–	–
Dried Blood	1	–	–
General Compounds	12	1	3
Growmore	3	–	–
Hoof and Horn	1	1	–
Indoor Plant Foods	10	–	1
John Innes Base	1	1	–
Lawn Feeds	6	–	1
Liquid Fertilisers	2	–	–
Nitrate of Soda	2	–	–
Nitro-Chalk	1	–	–
Phosphates	3	–	–
Rose Fertilisers	6	2	1
Sulphate of Ammonia	4	–	–
Sulphate of Potash	5	–	–
Tomato Fertilisers	2	–	–
TOTALS ..	62	5	6

TABLE VIII

UNSATISFACTORY FERTILISERS AND FEEDING STUFFS

Sample Number	Article	Nature of Irregularity
12	Super-creep Pellets (Formal)	The amount of oil found was 1.1 per cent more, the amount of protein found was 9.1 per cent more and the amount of fibre found was 1.1 per cent less than the amounts stated.
17	Mainfeed Cakettes (Formal)	The amount of protein found was 1.8 per cent less, the amount of protein equivalent of urea found was 1.39 per cent less, the amount of fibre found was 4.3 per cent less and the amount of magnesium found was 0.35 per cent less than the amounts stated.
45	Dairy Nuts (Formal)	The amount of oil found was 1.0 per cent less than the amount stated.
74	Rose Feed (Informal)	The amount of nitrogen found was 2.0 per cent more, the amount of soluble phosphoric acid found was 1.1 per cent less, the amount of insoluble phosphoric acid found was 1.7 per cent more and the amount of potash found was 2.7 per cent less than the amounts stated.
131	A General Fertiliser (Informal)	The amount of manganese found was 7.5 parts per million less and the amount of magnesium found was 39.3 parts per million less than the amounts stated.
141	A General Fertiliser (Informal)	The combined deficiencies of nitrogen, phosphoric acid and potash exceeded the limit of variation applied.
151	Lawn Feed (Informal)	The combined deficiencies of nitrogen, phosphoric acid and potash exceeded the limit of variation applied.
159	A Pig Meal (Formal)	The amount of protein found was 2.0 per cent less than the amount stated.
172	A General Fertiliser (Informal)	The combined deficiences of nitrogen, phosphoric acid and potash exceeded the limit of variation applied.
198	A Plant Food (Informal)	The sample, which was contained in small foil packets, was found to have liquefied and decomposed; it could not be sampled or analysed.

MISCELLANEOUS SAMPLES

Classified List

Samples tested for pesticides 45

- 9 Trade wastes
- 11 Sewage effluents
- 23 River waters
- 1 Dust
- 1 Sheep dip

Dairy products tested for antibiotics 393

- 390 Milks
- 3 Creams

Foodstuffs 203

- 26 Almonds
- 1 Baby Food
- 1 Basil Leaves
- 11 Canned Meats
- 3 Cheeses
- 1 Cherries
- 5 Chips etc.
- 1 Coffee
- 1 Colouring Matter
- 4 Creams
- 9 Fish
- 3 Ginger Biscuits
- 2 Ice Creams
- 12 Milks etc.
- 1 Orange Peel
- 12 Pasteurised Eggs
- 101 School Meals samples
- 3 Sweets
- 1 Tea
- 2 Tomato Purée
- 1 Veal
- 2 Water Ices

Specimens from doctors and hospitals 515

489 Bloods for lithium
8 Bloods for magnesium
1 Blood for copper
6 Urines for magnesium
3 Urines for heroin
2 Urines for arsenic
1 Urine for sugar
4 Specimens for cannabis
1 Tablets for identification

Waters and Deposits 363

131 Drinking waters
36 Swimming pool waters
7 Deposits and chemicals for pools
10 Pond and lake waters
15 Stream and ditch waters
20 Sea waters and muds
29 Sludges etc. from Sewage Works
7 Industrial wastes
6 Percolates
1 Distilled water
101 Rain waters

Other Samples 143

7 Airs
1 Algicide
11 Cattle cakes
1 Chick feed
1 Christmas decoration
1 Clinker
13 Crustacea
3 Cups
3 Diesel oils
2 Disinfectant sprays
1 Dust
4 Engine oils
4 Firemen's overtrousers
1 Foam compound
2 Germicides
1 Herbicide
1 Insect

1	Intramammary injection
1	Lead paint
1	Lead sheet
12	Lichens
1	Nails
14	Paraffins
19	Petrol tanks
1	pH meter
1	Plastic beaker
2	Rat baits
7	Slags
10	Soils
6	Specimens from dead dogs
1	Terracotta
1	Toy drinking bird
1	Trousers
1	Urinal deposit
1	Washbasin trap
2	Waste acid and lime
3	White powders.

TOTAL NUMBER OF SAMPLES 1,662