

The Sampling of Imported Foods

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The U.K. relies heavily on imported foods. Methods of working in our ports have changed radically over the last fifteen years. The old type of port, where small packages of individual items were manhandled by a large labour force, has become a container port in which a few highly trained men mechanically handle large quantities of food in steel boxes. These containers are stacked in the open air and refrigeration is maintained where necessary. Sampling, also, has become a different skill. Information and intelligence are important as is co-operation and co-ordination with the sister services.

Sampling plans may be determined in general principle as a theoretical exercise. These general principles can be tailored to a particular ship when the manifest is received. By this means, the Shipping Company, H.M. Customs and Excise and other interested parties can be forewarned of the Port Health Authority's decisions and the containers which will be examined in detail can be set on one side as part of the off-loading and stacking procedure. The aim of sampling in port health work is to determine the standard of the whole consignment and the finding of an unsatisfactory sample will not necessarily be followed by prosecution. It will, however, be followed by decisions as to the disposal of the food either by release (conditional or unconditional), use for animal feed, re-export or destruction.

The factors involved in the formulation of sampling plans are dealt with and a number of examples are given. The interpretation of the results of chemical and microbiological examination of the samples is discussed in general terms and the various methods of disposal are briefly touched upon.

The paper concludes with a request for a feed-back of information from inland authorities in order to keep Port Health Authorities aware of problems which occur after foods have left the ports.

Before I embark on my paper let me ensure that I am not sailing under false colours. I am not a scientist, still less an academic scientist, and my paper will, therefore, deal largely with practicalities and hardly at all with theories and philosophies. It may be, therefore, that some of the things I say are vulnerable to attack. They are, however, based upon many years' experience and, as we shall see, that is a vital commodity in port health work.

This country, despite the efficiency of its farmers, imports a very large percentage of its food. The sheer volume of food coming through our ports is a major part of the problem of control. I am basically a seaport man, although for other purposes I have some responsibility at Heathrow Airport. In general, airport work does not differ greatly from seaport work, except that the volume of food imported by air is likely to be small but of high risk. The only considerable exception to that last point is that, during periods of shortage, some extraordinary foods are brought in by air at what must be great expense. For

instance, during the latter part of the drought of 1976, plane-loads of cauliflower flowers were imported through Gatwick Airport.

Constraints

The present constraints on money and staff may have distorted food sampling patterns at retail outlets. I have doggedly opposed any such constraints in port health work for a very good reason—it is not possible to limit, beforehand, the amount of effort that will be put into the examination of any particular consignment. As we shall see, one can sometimes determine beforehand what needs to be examined but it is always necessary to be prepared for that forecast to be wrong. In any case, forecasting time is limited to 3/4 days. Therefore, port health work is essentially a matter of crisis rather than routine and any attempt to determine the amount of money which will be spent on the work in a given financial year will probably fail.

Background to the Work

Let me try to sketch in the background against which our work is set because it has a bearing on our sampling methods. Ports used to be densely built-up areas full of men, ships and cargo. Foods were imported in traditional packings which normally meant that meat came in the carcass, fruit was handled in individual boxes and some foods were packaged in such things as barrels and sacks. These were literally manhandled and many men were involved, while ships took a week or more to turn round. There has been a radical change in this picture over only some ten to fifteen years. Heralded by palletisation, the era of the container and the roll on/roll off ferry truck has brought a striking speeding-up of the handling of cargoes and has changed the face of our ports. Everything is now subordinated to the container. The old port facilities based upon the warehouse have been swept away and ports are now characterised by large open concreted areas which are used for stacking containers, with just a few buildings for the specialised handling of containers under cover. Refrigeration facilities are literally built into the open spaces so that "reefer" containers can be handled. Let me emphasise that one of the buildings on such an open site must be given over to the Port Health Authority's food examination unit. Ships, today, must turn round in a few hours if they are to be economic. Therefore, on arrival, off-loading begins at tremendous pace. The empty stretches of concrete suddenly grow hundreds of steel boxes, many filled with food, but the Port Health Authority must, somehow, still concern itself with the individual unit of food, the cut of meat or the packet of frozen shellfish.

It might appear that the worst element of container work is the sheer quantity of food to be examined and it is a fact that many consignments include a large number of containers. However, I believe that the most difficult type of consignment to deal with is that exemplified by the trans-continental or inter-continental road truck which arrives on a roll on/roll off ferry. A tractor unit, with a crew of two, three or four men, may tow one or two containers and may have commenced loading somewhere in Asia or the Middle East. These trucks are now familiar sights in our ports and they are a problem both from the point of view of infectious disease and of food control. As you may imagine, the truck crews

are employed for their ability to navigate the juggernaut across the most difficult terrain for many long hours, rather than for their knowledge of British food legislation requirements!

Another of the changes brought by the container is the development of the port as a heavy industry. Previously, traditional cargoes were manhandled by large gangs of men. Nowadays, the number of men required is much smaller and enormous machines are used to pick up the great boxes and run around with them. No longer does the Port Health Inspector work quietly through a pile of packages of food in the darkness of a Victorian warehouse. Now, he wears a hard hat and an orange fluorescent jacket and he works out on the concrete, in amongst the machines, and in co-operation with both management and unions, as part of a team whose function is to speed the containers onwards. This is a position of no little difficulty and delicacy. He may feel almost schizophrenic in that he must try not to delay either the ship or the consignment of food but he must, nevertheless, carry out his statutory duty to protect the public health and he must do so without antagonising either the management of the port, the shipping companies or the unions.

The work, therefore, is both physically arduous and awkward. It is also complex and becoming more so. Food technology becomes ever more sophisticated, the theoretical concepts ever more difficult to assimilate and apply and always, in the background, is the quite astonishing amount of money involved. Any decision taken may well involve the gain or loss of many hundreds of thousands of pounds. It is all very well to be pompous and say that Port Health Authorities should not be concerned with such things. Life is not that simple. We all know that there are many shades of grey between the extremes of black and white and we all know that, where such sums of money are involved, a case taken to Court must be fought out against eminent Counsel and a team of experts, all attempting to tear the Port Health evidence apart. The Port Health Inspector must, therefore, know his business and he must not be the type to be frightened of his job nor yet to be too aggressively determined not to listen to reason. It is all the more essential that this work should be carried out on the basis of demonstrable knowledge and logic rather than on personal opinion or emotion. The advice of Public Analysts is absolutely vital here and the closest liaison and understanding is imperative.

Information and Intelligence

All of this leads up to the importance of information. I have already commented on the need to keep up-to-date with the latest in technological theory and practice. It is also essential that Port Health Authorities should actively seek intelligence on the way that food is handled overseas. All good public health men are insatiably curious and nowhere more so than in ports. They must always be asking questions and acquiring knowledge. Snippets of information and small clues to developments in the food field overseas must always be seized upon and followed up. Such information can be obtained from a vast variety of trade organisations, Central Government Departments, Trade Attaches, specialist organisations such as the Tropical Products Institute, our own Association, ASAPHA and, of course, the Association of Public

Analysts. All these sources can add something to the data bank which is at the heart of the working of every efficient Port Health Authority.

General shipping information is also important because it gives warning of the development of new trade patterns. This information is garnered from newspapers, specialist shipping journals such as Lloyds List, Port Authorities, High Commissioners' Offices and so on. Information on individual ships can also be obtained from Lloyds List and shipping agents and this can be extremely important in short-term forward planning. Local intelligence from shed foremen, clearing clerks, dockers and Customs officers in the field must not be underestimated. It is worth emphasising, once again, that, in a busy port, intelligence is absolutely essential and it must be actively sought. Co-operation and co-ordination are the bases of all our work and the experienced port health man will have a series of contacts in all the areas I have mentioned, which he will assiduously cultivate by ensuring that the system is a two-way one. In my opinion, to attempt the sampling of imported foods without the backing of such an intelligence system would be to work under a grave disadvantage and this is one of the reasons why I consider that by far the best, if not the only, place to examine imported food is at the port of first landing.

Preparation for Arrival of Food Cargoes

Before arrival of a ship, certain provisional plans as to the sampling procedures to be undertaken can be laid and preparations for that sampling can be made. The number of samples from a given shipload of food, or even from just one large consignment, can be very considerable and, therefore, the laboratories which are going to carry out chemical or microbiological examination of the food must be forewarned. It is not good enough to ring the laboratory and say that so many hundreds of samples will be arriving during that day. Consultation as to the best spread of delivery of samples must be carefully undertaken. Laboratories work under money and staff constraints and they must not be expected to accept anything and everything which is fired at them.

One of the best methods of obtaining some early warning of heavy arrivals is the study of the ship's manifest. This is a very extensive document which lists everything carried in the ship's cargo. It sets out what is in each consignment, together with the quantity, the type of packing, the port of loading, the marks, the consignor, the consignee and so on. After a request from us, the establishment number and description of cut is included in any manifest entry for meat. There is no short cut to dealing with this document. You must just work steadily through every page and, as a result, you will know precisely what food is being carried on the ship and you can make provisional decisions as to what you want to look at. Then you tell the shipping company or the company handling the containers and you also tell the Customs. Once again, co-operation and co-ordination. This principle is particularly important when dealing with containers, where the out-turn is often programmed by computer. You will not be popular with anybody if you insist on waiting until all the containers are stacked on the dock and then you go round picking out from the stacks those which you want to examine.

Action on Arrival

Earlier preparations should now pay off and the food needing to be seen should be made available. The basic principles of examination are the same whether the cargo has been loaded in the traditional way or has been palletised or containerised and whether the container is one of many on a ship or merely one on the back of a truck from a roll on/roll off ferry. Never make the mistake of thinking that, because the food is bundled up together on one pallet or in one box, it must be all of the same standard. The only way to be sure is to turn the whole lot out and when foods which are suspect or unknown are being actively screened, this is what must be done. In view of the size of some of these boxes, this is no small matter and it does demonstrate the importance of previous co-operation and co-ordination. Agreement or permission must be obtained from Customs, if they have not already cleared the food, and help from the Port Authority is needed to arrange the necessary gang of men to open and unstuff the container. Furthermore, whatever is to be done must not contravene the working agreements between management and unions.

We are now faced with the actual examination of the food. Patently, the whole consignment cannot be examined in detail. Therefore, where there is potentially significant variation between different units making up a consignment, no-one can be absolutely certain that no unfit food ever gets in through the port. Anyone who maintains that he can guarantee that all food coming through a given port is checked in depth is either inexperienced or stupid. One can only do what is possible. However, through knowledge and experience and by careful preparation and choice of sampling technique, the likelihood of anything harmful getting past can be reduced to the practicable minimum.

To those who are not conversant with port work, this may seem a philosophy of despair but it must be realised that the rationale of food control work in a port is quite different from that inland. There, quite rightly, sampling is intended to discover whether any unfit food is being sold to the public, no matter how small the quantity. Possession of such unfit food for sale is an absolute offence and prosecution will always be considered, if not always undertaken. In port work the aim of sampling is to determine the standard of the whole consignment and thereby prevent the entry of that consignment if it contains an unacceptably high proportion of unfit food. The finding of an unsatisfactory sample will not be followed immediately by prosecution. It will be followed by further sampling, if this is considered necessary, and also by the initiation of discussions with the importers as to the disposal of the consignment and prosecution will follow only if the importer refuses to agree a method of disposal which will protect the public health. Furthermore, the concepts of nature, substance or quality of the food, as used inland, are not used in ports. There, fitness or unfitness is the prime criterion but there is also power to deal with unsound and unwholesome food.

Sampling Plans

These are always the subject of great discussion in Port Health circles. The first and most important principle is that all sampling plans must be based on

logic. It has been well said that logic is the thin line which divides panic from neglect. It is all too easy to adopt a sampling plan based on emotional reaction which, if it is not panic, is certainly moving in that direction. On the other hand, a plan which is based on expediency, related to manpower and money shortages, would be regarded as neglect if, in hindsight, it were seen that such a plan had permitted unfit food into the country. As I have said, it is not logical to expect a Port Health Authority to examine every item of foodstuff that comes in. It is not logical because it is not possible and no responsible Port Health Authority would ever attempt it. What the Authority does attempt to do is either to monitor consignments of food or to screen them. Here one has to differentiate between those consignments which are known to be reasonably good, and need only the occasional check, and those which are doubtful and need to be sampled regularly. In the first case, the occasional sample should be taken to see what is going on. This is the sort of monitoring which is carried out in relation to such things as mercury in imported fish. In the second case, a sampling plan should be devised to provide a proper screening process, so achieving a regular supply of detailed information.

Second, as we have to make a selection of foods which need to be sampled, we must have a knowledge of the relative potential risks which would attend their consumption. This is why it is so essential to know the food technology standards which are available overseas. One tends, of course, to decide that food coming from known establishments, through known channels, and from countries which have a good record, need not be sampled at all, whereas a new foodstuff, which has undergone new processings in unknown establishments in countries which have not exported that food before, will be looked at rather carefully and will be screened for a time until the Port Health Authority is satisfied that it is safe.

The third point which needs to be taken into account in devising any sampling plan is that it must have a statistical basis. It is not necessarily the case that the more samples you take, the better pictures you will have of the total consignment. After all, the form in which food arrives in this country must control, to some extent, the way it is sampled. It would be a nonsense if a homogeneous consignment, being examined for a contamination distributed evenly throughout the body of the food, were sampled in the same way as a food made up of many relatively large particles, some of which may be heavily contaminated but others not at all. Different types of foods need different statistical sampling plans and I must emphasise that, when a Port Health Authority has taken the trouble to work out a proper statistical basis for its sampling, it will do no good for the importer to come along, take a couple of random samples and, if the results are different from those of the Port Health Authority, expect that Authority to back off and take no further action. International agreements must also have some effect on the way that sampling is planned. I must say now that some EEC proposals on sampling appear to me to be totally impractical and, so far as this country is concerned, I cannot see them ever being worked. They would involve far too much money, manpower and wastage of foodstuff. The International Commission on Microbiological Standards for Foodstuffs (ICMSF) has produced a very much more realistic system and it is very worthwhile

spending the time needed, at least by me, to assimilate the principles set out in the second volume. It is, of course, important that any sampling plan must have relevance to modern cargo handling techniques. It is not much good having a plan which applies to traditional cargoes but cannot be used in relation to pallets and containers.

Examples

Let me give some examples to illustrate the different sampling structures which are necessary in port work.

A. MEAT

Here the port control is only the last element of a system which is initiated by overseas inspection of meat-handling establishments by veterinarians from the Ministry of Agriculture, Fisheries and Food. Satisfactory results from these inspections lead to the approval by the Ministry of an establishment and the publishing of the number of that establishment for the information of Port Health Authorities, among others. Meat cannot be imported from any other than approved establishments and it cannot be imported through any other than ports which are approved by the Minister as having the facilities necessary for dealing with it. Furthermore, any meat consignment must be accompanied by the appropriate documentation, which includes a certificate of pre- and post-mortem veterinary examination for animal health purposes and an official certificate giving the establishment number—the latter being stamped always on the individual meat package or carcass and sometimes on the outside of the container. Our joining the EEC has meant that Brussels Directives are now law in this country and the EEC Directive on third country meat has distorted the above patterns. It is certain that sampling of meat from third countries, for animal and public health purposes, will, in the near future, increase significantly.

The present level of containerised meat import at Tilbury is 100,000 tonnes per annum, which will rise to about 350,000 tonnes p.a. when the new Northfleet Hope development is completed. This tonnage represents 35,000 containers. It is likely that a 1 per cent. sampling for examination will be needed after the EEC Directive on third country meat is implemented. This means that 70 tonnes of meat per week will be turned out for general examination at the new food examination unit at Tilbury, of which some fifteen hundred kilogrammes will be thawed, examined in great detail, sampled where necessary for laboratory examination and re-frozen.

Direct examination of meat is a demonstration of personal skill and experience and is still the only useful method, laboratory examination being limited to looking for residues of hormones, antibiotics and so on. In the examination of meat products, of course, laboratory examination is of much greater importance. Such a system does not permit of any extrapolation from the particular sample to the generality of the consignments, hence the very high sampling levels.

B. HOMOGENEOUS FOODS

There are consignments in which any contamination or other defect will be uniformly distributed and in these cases the method of sampling is much simpler. One needs only to take a sample which is large enough for the laboratory's needs and the result of examination will then reflect the quality of the whole consignment. An example of such is bulk wine, which is examined for the presence of preservatives and excessive levels of metals, among other things.

Some cargoes, which might be expected to be reasonably homogeneous, however, must be treated with care, as unexplained pockets of higher contamination are known to occur. An example of this may be found in the examination of bulk wheat for ergot contamination.

C. HETEROGENEOUS FOODS

Some consignments which I can only describe as "particulate" are particularly difficult, in that some single particles may be heavily contaminated while others may be absolutely clear and the contaminated particles may not be evenly distributed throughout the whole. An example of such a problem is a consignment of groundnuts. The individual nuts are packed in sacks, having been dried to a varying extent in the country of origin. The level of mycotoxin contamination must be determined, but, faced with a consignment of thousands of such sacks and the fact that one mouldy nut in a sack may contain enough aflatoxin to give a high level for the whole, how does one sample such a consignment so as to be fair to the importer and, also, to protect the public health? I am afraid that there is, as yet, no answer to that problem. Sampling is a matter of agreement, rather than enforcement, for two reasons. First, it is not possible to take a sample and obtain a result which is comparable with any other sample. Therefore, if you attempt to go to Court on one sampling, you *may* be lucky, in that you may be able to win over the Magistrate, but you will, more likely, find that the importer has repeated exactly the same sampling technique and has obtained quite different answers. The Magistrate is bound to take note of that fact, particularly when, under questioning by skilful Counsel, you have to admit that your sample is not necessarily representative of the whole. Second, while most of us are convinced that mycotoxins are undesirable, if not harmful, if eaten by human beings, there is no proof, as yet, of this. One has, therefore, to work on the unsound or unwholesome attributes of the food and this is never very satisfactory. The present system of sampling groundnuts is acknowledged to be unsatisfactory and is being actively reviewed by the Department of Health and Social Security.

A similar problem is found when examining prawns. This country imports a quite astonishing tonnage of frozen peeled cooked prawns, a large part of the imports coming from Malaysia. There, an artisanal fishing industry harvests prawns from warm tropical waters. Processing of the prawns is carried out in establishments which can only be described as "local" and in some of these establishments the pasteurisation of the prawns, and the food hygiene generally, is not satisfactory. Batches of prawns are brought together, very often in unsatisfactory conditions, from a large number of these small establishments for

final packaging for export and freezing. The product, therefore, on arrival in our ports, whether in 450 gm or 2500 gm packs, is heterogeneous and widely differing results can be found on examination of the different parts of a consignment or even one container. How then is one to deal with this problem? Once again, it is unsafe to rely upon the law, except where one might emotionally influence the Magistrate. An agreed Code of Practice has been formulated and it did appear to be the answer in that it laid down sampling techniques, a methodology for the microbiological examination and standard interpretations of results; but our early hopes for it have not been entirely realised. First, one cannot be sure that results from different laboratories are comparable. Much work has been done on this by the Public Health Laboratory Service and the situation has improved in this country but comparability between results here and in Malaysia is still not achieved. Incidentally, the same problem is encountered when comparing results from different analytical laboratories for such things as metals in foods. It is no secret that importers watch for such variations and switch ports to take advantage of what may seem to be an easier attitude. Standardisation, therefore, would be of very great benefit to port health authorities. Going back to prawns, there may also be a significant variation in results when samples are examined in the same laboratory, which means that absolute precision in the fixing of standards is not possible and some haziness of the dividing line, between what is acceptable and what is not, is inevitable. I understand that there is some movement towards the formulation of a new Code and I look forward to this with interest.

D. PROCESSED FOODS

The importation of so-called "convenience foods" or processed foods has increased greatly in recent years and they can be extremely difficult to handle in that consignments, aimed at delicatessens and similar "speciality" shops, may be made up of small quantities of a large number of different foods. The difficulty lies in the fact that there is no easy way of sampling to establish the condition of the whole consignment. The fact that the consignment is contained in one or more containers is an irrelevance. It must be dealt with as if it were a pile of individual packages. Examples of such consignments are convenience foods from the U.S., certain Chinese foods and, believe it or not, sweets from Spain.

In 1975, two containers arrived in the West India Dock from the U.S.A. They contained a wide range of American delicacies, each in small amount but making up a total of 2,474 cartons. It was decided that every food should be examined and 33 samples, one of each food, were taken. As a result, eight lots were found to be unfit and ordered to be re-exported, 19 were found to have labelling faults and only six were found to be satisfactory.

At the end of last year, one container arrived in Tilbury Dock, having been transhipped at Rotterdam from the Far East. It contained 585 cartons of Chinese foodstuffs from Hong Kong, made up of 29 separate, and different, items. Fortunately, 25 of these had been seen before in the port and had been sampled and found satisfactory, so they were released. The remaining four were sampled and only one found to be satisfactory.

During the early part of this year, a container arrived at Tilbury from Spain which, on turn-out, was found to contain a variety of sweets. Two kinds were

sampled and one was found to contain excess lead. All kinds were then sampled but only the one sort was found to be a problem, and it was unsatisfactory whether in packets or jars. Another consignment arrived in a later container and was again found to contain excess lead. Representations were made to the importers and a third consignment, in yet another container, was found to be satisfactory. This may, or may not, be cause and effect and future consignments will be closely watched.

E. MEAT PRODUCTS

As an example of really high risk meat product, let me quote the import into this country of large bowls of paté. Some of this paté has been found not to have been properly processed and it may have not only high colony counts of non-pathogens but also, from time to time, unacceptable counts of pathogens. The difficulty lies in the fact that the bowls making up the consignment are not all prepared in the same way. They are not even all of the same sort of paté and it is not possible to demonstrate that the whole consignment is unfit for human consumption simply by sampling one or two of the bowls. Sampling of such an indivisible unit of food almost destroys the saleability of that unit. Patently, if, to obtain a sample, you remove a lump of the pate from a given bowl, the rest of that bowl is almost valueless. Therefore, only a few of the bowls can be sampled and the results of examination of those few cannot be applied with certainty to all the consignment. One must attempt to demonstrate to the importer and, if he does not agree, to the Magistrate that, if a small number of samples, or even a small proportion of samples, have been found to be unsatisfactory, the risk of importing the whole consignment cannot be accepted.

The Aims of Sampling

In view of such a disparity of approach, can anything be said about the aims of sampling imported foods? Certainly one can say that the first aim must be to provide information on the standard of the whole consignment and I have tried to give examples of how this is done.

The second aim is to achieve a sampling level which, while satisfying the first aim, does not so decimate the value of the whole consignment that the trade is killed off. Sometimes, of course, one must simply insist, particularly where high risk, or quite unknown, foods are concerned but, by discussion with the importers, one may arrive at a level of sampling for future consignments which is satisfactory for both parties.

Third, sampling must be carried out in such a way that there is no delay to the ship and as little delay as possible to the consignment. Once again, sometimes it is not possible to achieve these aims. For instance, where sampling must take place directly from the ship, there is inevitable delay. However, in the vast majority of cases, delay to the consignment can be avoided, or at least minimised, by allowing the remainder of the consignment, after sampling, to go forward, under importer's guarantee and still subject to the imported Food Regulations, to be held inland while investigations are carried out. It must never be forgotten that a consignment of food may be held for only six days for examination. After this time, the importer may take it away.

Last, one must aim at delivering the sample to the laboratory in as near the same condition as it left the rest of the consignment as is possible and at a time when it can properly be dealt with by the laboratory.

Interpretation of Results

This paper would be incomplete without a brief reference to the interpretation of chemical and microbiological sample results and the action which may be taken thereon. This is very often a matter of balance of probabilities and some things which influence that balance are as follows.

(i) What happens to the food after leaving the port? This is particularly important following microbiological examination. For instance, food which is already cooked and will not be treated again before consumption cannot be allowed the same microbiological standards as food which will certainly be cooked before being eaten. Furthermore, the possibility of cross-contamination must be borne in mind although it must be admitted that this is largely a matter of education of the food handler.

(ii) What evidence is there of mishandling and bad food hygiene before export? Such malpractice might, of course, result in any pathogens which are carried by the food handlers overseas being passed on to the food. There is a case for saying that the presence of grossly high colony counts of non-pathogens raises this possibility.

(iii) What pathogens are present? Also, what number of pathogens should be permissible? It is not always practical to insist on a total absence of pathogens, as the necessary level of challenge must be reached before disease will be caused in the normal human being. The problem of experimental variation in laboratories is important when setting out standards or guidelines involving small numbers of pathogens.

(iv) Is the food sound and wholesome? This can be a very difficult question and in particular, the problem of the presence of moulds has been thoroughly discussed. Some years ago my Authority, at the instigation of Dr. Amphlett Williams, who was its Public Analyst at that time, and Dr. Greenwood Wilson, my predecessor-but-one, took successful action against the importers of tomato purées which showed an excessively high Howard mould count. The correctness of that action has been demonstrated by the increasing evidence of the number of mycotoxins which can be produced by food moulds.

(v) Is there any chemical contamination? This *may* be covered by Regulations but by no means always. I have mentioned mycotoxins but heavy metals are another problem which is now undergoing careful scrutiny. Here let me ask whether, while trying to fix an acceptable level of metal in a given food sample, one should think only of the national diet or realise that that diet is only an average and there are extremes on either side of it.

(vi) Is there evidence of damage or taint? This can be a particularly important part of port health work in that consignments of food aboard ship are not infrequently subject to damage from the weather and to taints from smoke, oil, foul or fresh water, chemicals and, in older ships, refrigerant liquids. Here, sampling is useless. The whole consignment must be dealt with as individual

units and the determination of what can be made fit by trimming or sorting can be a major, time-consuming task.

(vii) Is there an unacceptable level of infestation? This may be of great importance in cereal and nut cargoes and discussions on the possibility of treatment must be undertaken with great care.

Disposal

To complete the picture, how can one dispose of these foods? First, if after examination no abnormality is found (and please remember my previous caveat that this does not guarantee that the food is fit), the consignment will be cleared for sale. It should always be remembered, however, that a consignment which is passed at the port may become unfit thereafter. For instance, groundnuts which have only a minimal aflatoxin content at the port will, if they are not kept cool and dry, develop very high levels of the mycotoxin later on. Second, one may permit conditional release of foods which are safe enough if properly controlled. For instance, frozen cooked prawns which show only a certain level of colony count may be released, provided that the packet is marked to the effect that the food should be eaten immediately upon thawing. In these cases experience, judgment and trust are all of great importance. Third, foods may be released for animal feeding but one must be extremely careful not to allow food on to the market if it is going to be as harmful to animals as it is to humans, as in the case of mycotoxins, or if consumption by animals will introduce into the human food chain substances or organisms which will be harmful in the long run. Fourth, it may be possible to allow re-export of the foods to countries where the standards are not as rigorous as they are here. This must be a matter for careful consideration. Basically, my feeling is: why should we allow contaminated food to be foisted on people elsewhere and also risk the possibility of its being brought back to this country, possibly in a different form or packing? Finally, if all this fails, one must take the food before a Magistrate and ask for a Destruction Order.

Conclusion

I have talked about the necessity for information from abroad and what value this has to Port Health Authorities. Information from inland is every bit as important and, surprisingly, is not always forthcoming. I realise that it is not always possible for an inland authority to discover the port through which an unsatisfactory food entered the country. However, ASAPHA does run an information service, will always gratefully receive any information about imported foods and will circulate that information to its member authorities. In that way, Port Health Authorities can be made aware of the problems which occur after foods have left the ports and I would like to recommend this form of co-operation to you.