

GFB. 1.



MINISTRY OF FOOD

FOOD AND ITS PROTECTION AGAINST POISON GAS

*The Conservation of Food is Second
only to the Preservation of Life*

Crown Copyright Reserved

LONDON

PRINTED AND PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE

To be purchased directly from H.M. STATIONERY OFFICE at the following addresses:

York House, Kingsway, London, W.C.2; 120 George Street, Edinburgh 2;

26 York Street, Manchester 1; 1 St. Andrew's Crescent, Cardiff;

80 Chichester Street, Belfast;

or through any bookseller

1940

Price 3d. net



INTRODUCTION

BE REASSURED BUT BE PREPARED.

This booklet has been compiled with a view to giving a concise account of the dangers of gas contamination, of simple protective measures and of the procedure that will be followed to protect the public against dangers arising from food which may have been in contact with poison gas.

Aerial attacks in which poison gas is used are less likely to be a menace to our food supply than may popularly be imagined. Gross contamination in the immediate vicinity of an exploded gas-bomb or resulting from successful spraying by low-flying aircraft can render foods unfit for consumption, but clouds of gas or vapour in concentrations sufficient to incapacitate an unprotected person would in a number of cases have comparatively little effect on food.

At a time when no effort should be spared to conserve the food supplies of the country it is very important that the greatest care should be taken to give as much protection as possible to food stores, whether they are the relatively small supplies in the ordinary home or the great reserves in our warehouses.

READ THIS BOOKLET CAREFULLY AND HAVE
CONFIDENCE.

[This Booklet supersedes the information given in the A.R.P. publication "The Protection of Foodstuffs against Poison Gas" (2d.) which appeared in 1937.]

CONTENTS

PART I.

GENERAL CONSIDERATIONS

	<i>Page</i>
1. Brief Description of Poison Gases and of Gas Attacks	4
2. Danger of Contamination of Foodstuffs	5
3. General Character of Protective Measures	5
4. Value of Protective Materials	6
5. Effect of Poison Gases on Some Foodstuffs	7

PART II.

GROWING CROPS. FOOD ON THE FARM. LIVESTOCK, ETC.	9
--	---

PART III.

BULK STORES IN WAREHOUSES, DOCKS, ETC.

1. Protective Measures	II
2. Decontamination	II

PART IV.

SHOPS, HOTELS, INSTITUTIONS, ETC.

1. Protective Measures	12
2. Decontamination	13

PART V.

DOMESTIC PROTECTION

1. Protective Measures	13
2. Decontamination	14

PART VI

FOOD AND LIVESTOCK IN MARKETS	15
--------------------------------------	----

PART I.

GENERAL CONSIDERATIONS.

I. *Brief Description of Poison Gases and Gas Attacks.**

Although we commonly speak of poison gases, the term may be misleading because some of the poisonous substances employed in modern gas warfare are not gases but liquids or solids which can be spread over a wide area by the bursting of a bomb or by a suitable spraying device attached to an aeroplane.

The true gases, such as chlorine and phosgene, are, generally speaking, unsuitable for aerial warfare because when liberated by the burst of the bomb they are usually rapidly dispersed. The effect is, therefore, at best rather a localised one, but it must be borne in mind that a bomb of this type can produce a dangerous concentration of gas persisting for some time in a place where the ventilation is defective, such as a narrow passage, a cellar or other confined space.

Because they are rather readily dispersed by wind, air currents and rain, gases of this type are known as *non-persistent* gases. The one most likely to be employed in modern warfare is *phosgene* which produces damage to the lungs when inhaled. It is not a dangerous gas so far as the contamination of food-stuffs is concerned because, although they absorb it to some extent on exposure to fairly high concentrations they are seldom rendered unfit for consumption. Sometimes their palatability is impaired. (See page 7.)

Foods which have been exposed to moderate amounts of phosgene or certain others of the non-persistent gases can often be rendered fit for consumption, by the simple expedient of airing them for a day or two. This is usually done by spreading out the food or the food packages so that a current of air can circulate and carry away residual gas.

The group of *non-persistent* gases includes besides phosgene chemical substances which cause distress or disablement by
 irritation of the lungs—choking gases;
 irritation of the eyes—tear gases;
 irritation of the nose—sneezing gases.

More dangerous, from the standpoint of contamination of foodstuffs are the *blister* gases, of which the outstanding representative is *mustard* gas, which cause incapacitation by producing acute inflammation of the skin, eyes and throat. The blister "gases" are heavy, oily liquids, which are highly dangerous in themselves and which also give off a harmful vapour.

* Fuller information regarding poison gases is contained in A.R.P. Handbook No. 1, entitled "Personal Protection against Gas," H.M. Stationery Office, price 6d.

Their danger lies in the fact that the burst of a bomb not only produces an immediate cloud of vapour but also distributes splashes or spray over a wide area. The material thus dispersed continues to give off poisonous vapour by evaporation until it has been rendered harmless by appropriate decontamination. For this reason they are called persistent gases.

Mustard gas and some others of the persistent gases can also be sprayed over a wide area from low-flying aircraft, droplets of the poisonous material contaminating everything on which they fall.

One type of persistent gas which may possibly be used in the present war contains arsenic (Lewisite). This introduces the additional danger of arsenical poisoning.

The effect of atmospheric conditions is very important in considering the action of poison gases. Free circulation of air, wind, warmth and rain all accelerate the dispersal of both types of gas, but the rate at which blister gases disappear as a result of favourable atmospheric conditions is naturally much slower than in the case of the non-persistent gases. The most persistent contamination by poison gas prevails when the air is still and the temperature is low.

It should not be forgotten, however, that the dispersal of gas by wind or by an air-current may be a source of danger down-wind.

2. *Danger of Contamination of Foodstuffs by Poison Gas.*

It is important to remember that—

POISON GASES ARE HIGHLY PENETRATIVE.

FOODSTUFFS ARE OFTEN HIGHLY ABSORBENT.

MANY WRAPPINGS AND PACKING MATERIALS ARE ABSORBENT AND PERMIT THE PASSAGE OF POISON GAS.

If poison gas comes in contact with a foodstuff either by direct exposure or as the result of gradual penetration through the packing material it may result in that foodstuff being condemned by the authorised officer of the local authority either as dangerous or as unsuitable for human consumption.

3. *General Nature of Protective Measures.*

Three simple facts should be borne in mind:—

(1) Wherever air can penetrate poison gas can enter, unless intercepted as in a gas-mask.

(2) Any material which soaks up water or oil, even slowly, will absorb and ultimately permit the passage of poison gas.

(3) Ventilation may be helpful but do not forget that it may also be dangerous. It is helpful when the flow of air leads to dispersal of vapour. It will be dangerous if its direction draws gas or vapour into a food store.

With these three points in mind, and with a knowledge of the protective powers of various types of wrapping, it is largely a matter of common sense to decide upon the protective measures to be used in any particular case.

4. *Protective Value of Materials Used for Holding or Covering Foodstuffs.*

The relative protective value of a number of materials commonly employed for packing foodstuffs are given below:—

<i>Nature of Covering.</i>	<i>Protection against Poison Gas or Vapour.</i>	<i>Protection against Liquid Poison Gas.</i>
Sealed metal drums	<i>Complete</i>	<i>Complete.</i>
Sealed metal-lined cases or casks.	<i>Complete</i>	<i>Complete.</i>
Sealed tins	<i>Complete</i>	<i>Complete.</i>
Tins with well-fitting lids but not sealed.	<i>Fairly Good</i>	<i>Good.</i>
Glass bottles, glazed earthenware vessels with well-fitting stoppers or lids of glass, metal, bakelite or similar impervious materials.	<i>Complete</i>	<i>Complete.</i>
Bottles or glazed vessels with ordinary cork stoppers.	<i>Fairly good</i>	<i>Good.</i>
Sealed wooden barrels such as are used for transporting and holding liquids.	<i>Complete</i>	<i>Complete, except in cases of heavy and prolonged contamination which may lead to the wood becoming impregnated to a significant depth.</i>
Bottles and jars covered by grease-proof paper.	<i>Fairly good</i>	<i>Moderate, but additional protection can be provided by an outside covering of a transparent cellulose wrapping.*</i>
Waxed Cartons	<i>Good if well sealed</i>	<i>Good if all joints are waxed or covered by a layer of a transparent cellulose wrapping.</i>
Papier maché cartons	<i>Good if well sealed</i>	<i>Fairly good. A transparent cellulose wrapping gives additional protection.</i>
Transparent cellulose wrappings.*	<i>Good</i>	<i>Good.</i>
Bags lined with transparent cellulose wrappings.	<i>Good</i>	<i>Good.</i>
Metal foil wrappings	<i>Good if no pinholes</i>	<i>Good if no pinholes.</i>
Oilskins, tarpaulins	<i>Fairly good</i>	<i>Good.</i>

* Many types of cellulose wrappings are on the market. Those prepared from cellulose, cellulose acetate and nitrocellulose are, in general, good as protective wrappings against gas. Those based on benzyl cellulose are less satisfactory.

<i>Nature of Covering.</i>	<i>Protection against Poison Gas or Vapour</i>	<i>Protection against Liquid Poison Gas.</i>
Greaseproof paper* ...	Good ...	Fairly good if contamination slight.
2- or 3-ply bitumen or tar-lined paper.	Good ...	Fairly good if contamination slight.
Wooden boxes ...	Good if all joints tight.	Poor. Soft woods are very absorbent.
Thick cardboard boxes ...	Good if all joints tight.	Poor, very absorbent.
Paper containers ...	Poor ...	None.
Sacks, canvas, hessian and other textiles.	None ...	None (except when used as screens).

5. Effect of Poison Gases on Some Foodstuffs.

(a) *Non-Persistent Gases (non-arsenical)*.—The ordinary cloud of these gases (e.g. phosgene) will not appreciably affect foods directly exposed. Any temporary effect will pass off after the cloud disperses and the food will, for all practical purposes, be unharmed.

Prolonged exposure to a relatively high concentration of a non-persistent gas of the phosgene type, such as might easily occur in a confined space, may cause slight deterioration, but it is important to remember that it is more likely to affect palatability than to render the food in any way unwholesome as an article of diet.

Effects of High Concentrations of Phosgene on Foods.

<i>Food.</i>	<i>Effect.</i>	<i>Whether dangerous.</i>	<i>Treatment.</i>
Flour ...	Becomes sour and slightly unpalatable. May make a poor loaf.	No	48 hours airing. Can then be blended with five parts of undamaged flour and will bake normally.
Bread ...	Outer layers may become unpalatable.	No.	Cut away outer layers and air remainder.
Cereals ...	Negligible ...	No.	48 hours airing.
Meat and Fish ...	May become slightly discoloured on the surface.	No.	Condition improved by airing and cooking.
Milk ...	May slightly affect taste	No.	Bring to boil.
Eggs ...	None ...	No.	—
Cheese, Butter, Margarine and Fats.	May bleach slightly on surface.	No.	If bleached, cut away affected part, which may be used for cooking. Remainder is edible.
Fresh Fruits ...	Almost none ...	No.	Air and peel off skin or outer layer.
Dried Fruits ...	Slight loss of palatability	No.	Air and cook.
Fresh Vegetables	Green vegetables may be slightly bleached.	No.	Air and cook.
Tea, Coffee ...	May become bitter and unpalatable.	No.	None is effective, but such material might be used for blending.

* Creasing of these papers will greatly diminish their protective value.

(b) *Arsenical Non-Persistent Gases*.—These poison gases are employed as nose irritants and are released in the form of invisible clouds of fine particles which are rather readily dispelled. It is improbable that such a cloud would significantly affect foods with which it came in contact. Airing would be the appropriate treatment, but it must not be forgotten that there may be a risk of arsenical contamination. Affected food would require expert examination before being released for consumption. A high concentration of arsenical gas, e.g., in an enclosed space might contaminate foodstuffs with arsenic in quantities sufficient to render them dangerous as food.

IF THERE IS THE SLIGHTEST SUSPICION THAT ARSENICAL GAS HAS AFFECTED A FOOD IT SHOULD NOT BE EATEN. EXAMINATION BY A COMPETENT EXPERT WILL BE NECESSARY. ALL SUCH TESTS WILL BE CARRIED OUT BY THE LOCAL AUTHORITIES.

(c) *Persistent Tear Gases*.—It is considered unlikely that these poison gases will be used in attacks on the civilian population. Either in vapour or in liquid form they are liable to affect foods by rendering them highly unpalatable. Airing is the only treatment that is likely to be of any value in attempting to recondition foodstuffs which may have become affected, but if much gas has been absorbed it will probably prove ineffective.

(d) *Blister Gases (non-arsenical)*.—The vapours of mustard gas and other blister gases which do not contain arsenic may be harmful to foods when the concentration of vapour in the atmosphere is high and exposure has been prolonged.

Slight contamination may affect palatability, but *with the exception of fatty foods*, materials should be edible after airing for 48 hours and cooking. All fatty foods should be regarded with suspicion after exposure to blister gas vapour.

Effect of Exposure of Uncovered Foods to Low Concentrations of Mustard Gas Vapour.

<i>Food.</i>	<i>Effect.</i>	<i>Whether dangerous.</i>	<i>Treatment.</i>
Bread, Flour, Cereals, Lean Meats, White Fish, Eggs, Fresh and Dried Fruits, Vegetables, Tea, Coffee, Sugar, Con- diments.	In most cases no ill effect noticeable after treatment. In others there may be slight loss of palatability.	No.	Airing is the general treatment. In some cases (e.g., lean meat) the surface layers can first be cut away.
Milk, Cream, Butter, Margarine, Fats, Oils, Fatty Meats, Fatty Fish, Cheese.	Rapidly absorb gas and may become unpalatable.	Prob- ably.	None effective.

All food which has come in contact with liquid blister gases (non-arsenical) must be regarded with suspicion, but FATTY FOODSTUFFS (Milk, Cream, Butter, Margarine, Cheese, Lard, Bacon, Fatty Meats, Salmon, Herrings, Kippers, Salad Oil) contaminated in this manner will almost certainly be highly dangerous.

(e) *Arsenical Blister Gases (Lewisite Type)*.—FOOD WHICH HAS BEEN IN CONTACT WITH THESE, EITHER IN LIQUID OR VAPOUR FORM, SHOULD BE REGARDED WITH THE GREATEST SUSPICION. THERE WILL BE CONSIDERABLE DANGER OF ARSENICAL POISONING. AN EXPERT EXAMINATION WILL BE NECESSARY.

(f) *Contamination of Water Supplies*.—There is little to fear from aerial attack so far as the main supplies of water are concerned. It is improbable that contamination will ever occur on a scale sufficient materially to affect the safety of the supplies in large reservoirs. In all events, the waterworks authorities throughout the country will deal adequately with any case of contamination, great or small.

Smaller supplies of water in tanks and storage vessels are liable to contamination and should, therefore, be covered so far as is practicable.

Non-persistent gases and the vapour of persistent gases are unlikely to harm water in tanks, etc., unless contact is prolonged and the concentration of gas or vapour is high, as, for example, in a confined space, but contamination with poison gases in the form of drops of liquid or particles of solid may be more serious.

IF WATER TASTES OR SMELLS PECULIAR AFTER AN AIR RAID OR IF YOU HAVE ANY OTHER REASON FOR SUSPECTING THAT IT HAS BECOME CONTAMINATED, REPORT THE MATTER IMMEDIATELY TO AN AIR RAID WARDEN OR TO THE POLICE.

PART II.

GROWING CROPS, FOODSTUFFS ON THE FARM. LIVESTOCK.

I. *Growing Crops.*

It is not considered likely that the enemy will attempt to harm growing crops by aerial attacks in view of the fact that the results would not be worth the effort required. Nevertheless, chance contamination resulting from a bomb or spray intended for another objective may occur.

The explosion of a gas-bomb of any type would probably cause scorching and bleaching of the vegetation in the immediate vicinity and to some extent down-wind. Much the same effect would be produced by poison gas of the mustard gas type liberated in the form of a spray from low-flying aircraft.

With the exception of arsenical gases of the Lewisite type, the effect on pasture or crops would probably be transient. Exposure to the weather will in time remove all traces of the poisonous material and in due course the vegetation will recover. The time required for this weathering will naturally be dependent on the character and extent of the contamination and on the atmospheric conditions, but, in general it can be expected that crops would probably begin to recover from the effects of non-arsenical poison gases after about a week.

Arsenical gases, particularly Lewisite, would, however, cause much more serious damage owing to arsenic being a powerful plant poison. A considerable time might elapse before vegetation would grow again where contamination of this type had been heavy.

If a gas-bomb falls where there are growing crops, or if it is suspected that crops have become contaminated by gas spray, notification should be sent without delay to an Air-Raid Warden or the Police.

It is very dangerous to walk over ground contaminated by blister gases unless fully protected by special clothing.

The A.R.P. personnel will attend to earthing in the bomb crater and any other measures immediately necessary. They will also advise as to what further precautions may have to be taken.

2. Foodstuffs on the Farm.

In view of the probability that farm buildings are unlikely to be affected by poison gas except by an unfortunate chance, it does not appear necessary to recommend any special protective measures for food supplies stored on the farm. With the exception of arsenical gases, none of the modern poison gases are likely to affect stacks of hay, unthreshed grain, or the usual farm stocks, to an extent that cannot be remedied by natural weathering or airing. If it is desired to give such stocks of food additional protection this can best be provided by the intelligent use of impervious tarpaulins, oilskins or other coverings. Even canvas or sacking may provide useful protection by soaking up drops of liquids and, thereby, reducing the direct contamination of foods which they cover. If foodstuffs in barns or granaries become contaminated by poison gas, they should be left for the A.R.P. personnel to deal with. *There is a grave risk of serious personal injury if salvage is attempted by unprotected or inexperienced individuals.*

3. Livestock.

Farm animals would soon be incapacitated by exposure to poison gas in any form. They would also be harmed by grazing pasture or eating fodder which was contaminated by persistent gases, although some animals instinctively refuse to eat tainted food. It will probably be necessary to slaughter animals showing symptoms of poisoning as a result of inhaling gases or eating contaminated foods. Arrangements have been made whereby the organisation created by the National A.R.P. Animals Committee (N.A.R.P.A.C.), acting in close co-operation with the Police, the local A.R.P., and the local authorities, will deal with such animals. It may be remarked, however, that the carcasses of such animals will not necessarily be unfit for human food. They will be carefully examined by competent experts.

PART III.

BULK STORES IN WAREHOUSES, DOCKS, ETC.

1. *Protective Measures.*

(i) Wherever possible vulnerable foods, e.g. those stored in sacks, hessian wrappings, open crates, etc., should be stored elsewhere than on top floors or in basements.

(ii) Tarpaulins, preferably of the oil-painted, impervious variety or oilskins are the best forms of cover for stores of foodstuffs in packages. They give good protection against oily splashes of liquids such as mustard gas. Such protection will greatly reduce the labour of the decontamination personnel.

(iii) Wherever practicable the tarpaulins should closely cover the piles of packages, but when this is not convenient they can be arranged as coverings fastened on hooks or frames so as to form screens or curtains. Where free circulation of air is essential for satisfactory storage, e.g. fresh fruit in crates, etc., the screens or curtains should be arranged so that they can readily be pulled into position immediately a raid warning is given.

(iv) Canvas or sacking can be used to provide coverings or screens when tarpaulins or oilskins are not available. They give no protection against gas or vapours but they reduce contamination by liquids by soaking up the oily drops. Anything that helps to protect the actual food containers from becoming splashed is of value.

(v) Food in chambers such as refrigerator stores, cold rooms, gas chambers, etc., requires no additional protection, providing the doors are reasonably gas tight and that precautions have been taken against contaminated air entering by a ventilation system.

2. *Decontamination.*

(i) Bulk supplies of food which have become contaminated by poison gas should not be touched except by those fully trained in decontamination methods and adequately equipped with protective clothing, respirators, etc. Rough-and-ready attempts to decontaminate may lead to injury of the persons concerned and to loss of food which otherwise might have been salvaged. If A.R.P. personnel is not immediately available a report should be made without delay to an Air-Raid Warden or to the Police.

(ii) The local authorities have powers under Regulation 25 (2) of the Defence Regulations, 1939 (Statutory Rules and Orders, No. 927) to seize, hold and condemn food which has become contaminated by poison gas. These authorities will examine



all such food and decide whether it can be released after appropriate treatment for use as human food, whether it shall be diverted after treatment for other use, or whether it shall be destroyed. They will also decide upon the methods of treatment and of destruction.

(iii) The task of the A.R.P. personnel will be facilitated if there is space near the food stores where stocks of contaminated foods could be subjected to the airing which will in most cases be the appropriate treatment. Airy top floors or open or well-ventilated sheds are suitable for this purpose. Fans would be useful accessories in this connection.

PART IV.

RETAIL SHOPS, HOTELS, INSTITUTIONS, ETC.

I. *General Precautions against Gas.*

(i) Rooms employed for the storage of non-perishable food which might be liable to come in direct contact with gas or which is contained in permeable wrappings can be gas-proofed if that precaution is thought to be desirable. It is quite a simple matter to do this. Full instructions will be found in A.R.P. Handbook No. 6 (Air Raid Precautions in Factories and Business Premises), obtainable from H.M. Stationery Office or through any bookseller, price 6d.

(ii) Supplies of packed foods should be left as long as possible in their original packings.

(iii) Tarpaulins, particularly those of the impervious, oil-painted type, or oilskins, form a good secondary protection for stores of packed foods. They can either be wrapped round the stack of boxes, etc., or can be used in the form of screens supported on a framework. They serve to give protection against splashes of liquid poison gas which otherwise would soak into the outer coverings of packed foods and thus make a great deal of additional work for those charged with the task of decontamination.

(iv) Even screens of canvas or sacking are useful if tarpaulins or oilskins are not available. They soak up oily drops, such as splashes of mustard gas, and, thereby, reduce to an appreciable extent the chances of the food packages becoming directly contaminated.

(v) Refrigeration or cold stores should be examined to ascertain whether the fittings of the doors and the locking devices are in good working condition. In good condition such chambers will give complete protection against gas.

(vi) The exposure of food in windows or on open shelves, where liability to contamination would be greatest, should be reduced to a minimum.

2. *Precautions to be taken in the Event of an Air Raid Warning.*

(i) All windows, doors, shutters, etc., should be closed and any other precautions taken which time permits to shut off the food supplies from contact with the outside air.

(ii) Extractor fans or other artificial ventilating systems that draw outside air into a food store or chamber should be shut off.

3. *Decontamination.*

(i) IN NO CIRCUMSTANCES SHOULD AN ATTEMPT BE MADE TO DECONTAMINATE AFFECTED PREMISES OR TO TOUCH THEIR CONTENTS. EVERYTHING SHOULD BE LEFT TO THE LOCAL AUTHORITY AND THE A.R.P. PERSONNEL. DECONTAMINATION IS A HIGHLY DANGEROUS UNDERTAKING AND REQUIRES SKILLED ATTENTION.

(ii) There is need for the greatest caution, even if there is not gross contamination in the immediate neighbourhood of the food. Doors, windows and shutters should be kept tightly closed and ventilation fans should not be started up again until it is certain that all dangerous gas has been dispersed from the immediate vicinity.

IN CASE OF DOUBT CONSULT THE A.R.P. PERSONNEL.

(iii) If material in a store has become contaminated, the local authorities will decide whether decontamination can be carried out on the spot or whether it is necessary to remove it for treatment or destruction. Authority for seizure and destruction is given to them under Regulations 25 (2) of the Defence Regulations, 1939 (Statutory Rules and Orders, No. 927). Everything that is practicable will be done to take an inventory of food removed for destruction or decontamination treatment but it must be understood that the conditions prevailing after an air-raid may make this difficult.

(iv) Food supplies which are removed and which can be effectively decontaminated may subsequently be released for consumption if passed as edible after examination by the local authorities.

PART V.

FOODSTUFFS IN THE HOME.

I. *Protection.*

(i) Foods contained in air-tight containers (e.g., sealed tins and bottles) are completely protected against any form of gas, *but do not forget* that it is important to protect the outside of the containers from contamination by splashes of mustard gas or other poisonous liquids. *Therefore, place as many as possible of your tins, bottles and other closed food containers inside cupboards (preferably not those with glass doors) or strong wooden or cardboard boxes with well-fitting lids.*

(ii) If you are uncertain whether a container is gas-proof additional protection can be given by wrapping it tightly in a sheet of transparent cellulose wrapping material similar to that used to cover cigarette cartons and chocolate boxes.

(iii) *Store as much food as possible in tins with well-fitting lids* or in bottles with good stoppers or screw-caps. *Clean, dry biscuit tins* serve to hold supplies of flour, rice, pea-flour and similar non-perishable foods. If they are reserve supplies the tins or bottles can be carefully wrapped in transparent wrappings before being put in a cupboard or on a shelf.

(iv) *Bread and cakes* should not be kept unprotected or merely in vessels with loose-fitting lids. Keep them in tins with well-fitting lids.

(v) *Perishable foods*, such as meat, fish, eggs, milk, butter, etc., will be quite safe if kept in one of the ordinary types of domestic refrigerator, providing the door forms a reasonably air-tight seal. In other cases protection for perishable foods should be contrived by the intelligent use of tins, bottles or wrappings of the type mentioned above.

(vi) It is important to remember that opened bottles of preserves, sauces, etc., will be very likely to absorb blister gas where some of the contents are smeared round the opening. *A tin will provide reasonably good protection for such bottles.*

A SPECIAL STORE CUPBOARD OR STOREROOM FOR NON-PERISHABLE FOODS CAN BE RENDERED GAS-PROOF WITH A LITTLE EFFORT. Instructions how to do this were given in the pamphlet entitled, "The Protection of your Home against Air-Raids", which was distributed to every householder.

2. Decontamination.

In the event of an area being affected by poison gas, the decontamination of the houses and necessary treatment of the contents, including foodstuffs, will be carried out by the A.R.P. personnel and officers of the local authorities.

IN NO CIRCUMSTANCES SHOULD AN INEXPERIENCED PERSON ATTEMPT TO COPE WITH APPARENT CONTAMINATION OF FOODSTUFFS IN THE HOME. UNSKILLED EFFORTS MAY LEAD TO SERIOUS PERSONAL INJURY AND TO WASTE OF FOOD.

Decontamination squads may be obliged to remove contaminated food or food suspected of being affected, and it may be found necessary to destroy that which is rendered unsafe for use.* That which can be successfully decontaminated

* Powers to seize and decontaminate or destroy food contaminated by lethal gas or other noxious substances are given to the local authorities under Regulation 25 (2) of the Defence Regulations, 1939 (Statutory Rules and Orders, No. 927).

will be released after it has been rendered harmless. *All these tasks will be carried out by the local authorities.*

Foodstuffs which are slightly affected as regards colour and palatability by contact with poison gases may, nevertheless, be quite free from danger after adequate airing and cooking, but nothing that is under suspicion should be used as food. It must be examined by a competent person before it can be decided whether it is harmless or not.

IF A HOUSEHOLDER HAS THE SLIGHTEST SUSPICION THAT FOODSTUFFS HAVE BEEN AFFECTED BY POISON GAS, AN AIR-RAID WARDEN OR THE POLICE SHOULD BE NOTIFIED IMMEDIATELY. ASSISTANCE AND ADVICE WILL BE FORTHCOMING AS QUICKLY AS POSSIBLE.

PART VI.

FOOD AND LIVESTOCK IN MARKETS.

It is clearly impracticable to make any general recommendations under this heading. Those in authority on the spot will have to take such steps as may appear advisable. If the market is in a building which can be closed, obviously everything which can be done to prevent entry of gas, e.g., closing of windows, doors, shutters, etc., should be done immediately an air-raid warning is given.

Little or nothing can be done to give protection to food exposed in open-air markets.

IF FOOD IN MARKETS BECOMES CONTAMINATED BY POISON GAS NOTIFY AN AIR-RAID WARDEN OR THE POLICE IMMEDIATELY.

All contaminated food will be held until it has been inspected by the public health officials of the local authorities, who will decide whether it can be decontaminated or whether it is to be destroyed.

Livestock in markets which may be affected by poison gas will be examined by the Police and the appropriate officers of the local authority, who will decide if the animals are to be slaughtered, and, if so, to what extent the carcasses are fit for consumption. The organisation of the National A.R.P. Animals Committee will co-operate with the local authorities in this work.

COMMON PESTS OF GRAIN AND OTHER STORED PRODUCE

Destruction of stored produce by insects causes loss to all concerned: the miller, the farmer, and the transport agency. In their interest, and that of the nation as a whole, this waste should be avoided. To combat serious attack specialized methods are required; but in storage for short periods, the damage can be greatly reduced by simple precautions which everyone should take. These are described in a pamphlet issued by the Department of Scientific and Industrial Research.

Price 3d.

By post 5d.

HIS MAJESTY'S STATIONERY OFFICE

LONDON, W.C. 2 : York House, Kingsway

EDINBURGH 2 : 120 George Street

MANCHESTER 1 : 26 York Street

CARDIFF : 1 St. Andrew's Crescent

BELFAST : 80 Chichester Street

or through any bookseller