

PRODUCTION AND SALE OF FRESH FROZEN
OR CHILLED MEAT CUTS:-
GUIDELINES FOR SLAUGHTER, MEAT CUTTING,
PACKAGING, STORAGE AND HANDLING OF FRESH
AND FROZEN MEAT CUTS

BY

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INTRODUCTION

It is commonly accepted that the retail of fresh meat in Ghana is grossly abused in terms of meat preparation, handling, transportation, storage and display for sale.

Slaughtering facilities and animal slaughter itself are also poorly organised including even clandestine slaughter of cattle, small ruminants and pigs.

These facts commonly lead to the purchase and consumption of poor quality fresh or processed meat and the risk of possible infection from micro-organisms of public health hazard.

This document seeks to provide guidelines for the slaughter, meat cutting, preparation, packaging, storage and sale of fresh chilled or frozen meat cuts, and materials required for a small-scale meat processing activity.

It is hoped that the extension of information in this document will help to correct some of the basic don'ts in fresh meat preparation, processing, handling, storage and sale. This I hope will assure the consuming public of a more hygienic and wholesome meat for consumption.

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The activities in the meat sector may be divided into three stages - slaughtering, meat cutting and further processing. Each stage involves completely different technical operations which must not be viewed as separate and independent processes.

There are significant interactions between the stages and shortcomings at one stage can have a serious negative impact on the product or process in a subsequent stage.

The processes in the meat sector will be discussed below as follows:-

1. SLAUGHTERING

Before animals are slaughtered (in a slaughter house approved by the government), slaughter animals are first brought in from the farm and rested (at least 24 hours) at the premises of the slaughter house in a fenced area called lairage. At the lairage, animals are given only water (but not food) for the period of holding before slaughter, which is usually within 24 hours.

(i) Antemortem inspection

This is the first inspection carried out on live slaughter animals at the lairage by a qualified veterinary officer. Animals passed for slaughter are then separated from those that fail the inspection.

It will be assumed that animals will be slaughtered under supervision by a veterinary officer and under hygienic conditions in the slaughter house.

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After slaughtering, carcasses will be dressed, washed and split into two sides (especially for beef). After this elaborate process, the veterinary officer or the meat inspector will inspect the Carcasses and pass them for fitness to be consumed by appending an approved stamp on the carcass.

At this point, the carcass is ready to be transported to the processing hall for boning, cutting/for other processing activities. /and

Ideally, the carcasses must be chilled in a cold room within the premises of the slaughter house (at a temperature of about -1°C overnight) before further processing or cutting of the meat for sale. This facility is not available in Ghana. However, inspected and passed carcasses can be transferred to the processing site in refrigerated vans which will provide about 0°C temperature conditions within the insulated cabinet of the van. Clean wheel barrows or trolleys must be used to cart meat but not to be carried on the shoulder or back. This can lead to contamination of the carcass.

It is recommended that when meat arrive at the processing site, the cold chain must be further maintained. Thus, meat must be transferred from the refrigerated van very quickly into a chill room which must provide between 0 to -2°C temperature range. The meat must be kept in this condition for at least 24 hours before meat cutting and boning operations.

(ii) Facilities at the meat processing hall

The meat processing hall must be a clean room, large enough to hold a couple of meat cutting tables, boning blocks, packaging tables and other processing equipment to be discussed in due course.

The roof (or ceiling) of the room must be high enough to allow for greater head clearance and also well lit. Windows must have mosquito netting to prevent entry into the hall of insects, so is the door or doors of the hall (in the form of trap door with mosquito netting).

The room must be air-conditioned to provide chill temperatures of between 5 to 10°C during processing time.

The walls of the processing hall must be tiled at least half way up and the floor polished smooth of terrazo.

There must be provision of a hot water system, cold water flowing at all times and a large sink for washing. Drain water must be effectively channeled so that waste water and scrap meat are efficiently disposed of to avoid pollution of the surrounding environment.

Meat cutting tables and boning blocks must have a hard poly top for effective cleaning. Water hose must also be present to facilitate cleaning of walls and floor with water jet at the end of processing. It must be stressed that license must be obtained from the local council or appropriate quarters for the operation of such a premises.

2. Deboning and meat cutting operations

Deboning and meat cutting operations for the trade (retail market) may take a different form from similar operations meant for bulk packaging. Retail cuts may involve separation of individual cuts and packaging them separately into the following, for example for beef: silverside, topside, thick flank, rump steak, fore and mid-rib, chuck, neck, shin, brisket etc.

Packaging deboned meat for bulk sale may involve cuts such as (for beef): fore-quarter, hind-quarter cuts, flank cuts etc.

Edible offals such as kidney, intestines, heart, liver, lungs, spleen, etc. may also be thoroughly washed packed and frozen (-18°C) for sale.

It is good to note that edible offals have a poor shelf life, hence temperature reduction must be prime during processing and the packed meat must be frozen at the least possible time.

Packaged deboned meat cuts in cartons of say 25kg. weight must

first be plate or blast frozen to reduce temperature of meat very fast to a minimum temperature of about - 18°C before frozen packages are transferred to the cold store to maintain that temperature. A Cold storage temperature of - 30°C is optional for prolonged storage but - 18°C is quite commonly used as frozen storage temperature.

When frozen meat packages are being transferred over long distances, it is imperative that the packages are moved under refrigerated conditions to maintain the cold chain, thus the use of a refrigerated vehicle.

The following below are some tit-bits on handling and temperature control for meat.

- (a) When packaging deboned meat cuts, let the fat surfaces appear at the top of the package. This is to avoid discolouration of fat by the exudation of meat juices.
- (b) There must be a distinct separation between slaughter house area from meat processing area. There must be further distinction and separation within the processing area such as: separation of boning and cutting room or area from chilled meat packaging area.
- (b) Operatives at the fresh state boning and cutting area must not be allowed into the finally chilled and packaging area.

All operatives must be provided with a white clean overcoat, head gear and boots. In addition, operatives doing the cutting and boning must be provided with stainless steel aprons and hand gloves to protect them from injury.

- (c) A set of cutting equipment must be available as follows:
 - various cutting knives and files for sharpening
 - Hand saw with replacement blades
 - Boning axe
 - Band-saw with replacement blade.

Other items required for packaging and holding of meat include the following:-

- Shelves (made of wood) to hold meat cuts
- Packing tables also to hold meat cuts
- Plastic trays and boxes to hold meat cuts.
- Weighing scale and heat sealing machine.

NB: Bones obtained from meat cutting operations can be chopped into bits and packed for sale under frozen storage. Please do not overload the cold store. Allow for adequate flow of cold air within.

3. Meat processing into comminuted meat products, cured meat products and smoked meat products

The essential ingredients required for comminuted meat processing include the following:-

- Natural and artificial casings
- Fillers
- Food colours and spices
- Salt, sugar, curing salts like sodium nitrite and sodium nitrate (mainly for cured products like salted beef, pork, bacon and ham).
- Packaging films (including stretch and shrink wraps).
- Plastic drums for curing meat.

Equipments include the following:-

- Mincer and mixing composite machine
- Meat slicer
- Bowl cutter
- Filling and linking composite machine
- Tipper clipper for end-sealing of sausages stuffed in artificial casings.
- Vacuum sealing machine
- Smoke house.. A locally constructed one can be made using a design which will be given upon request.

NB:- Recipes, formulations and process methodology for the manufacture of sausages, bacon, ham, salted pork and beef, minced meat etc. will be provided upon request.

4. Retail Shop premises

The retail shop must be clean, sited at a clean place and not near rubbish or toilet facility around the area.

License, once again is required from the local council for the operation of such a premises. A typical meat retail shop will have a counter beyond which a meat display cabinet delivering a temperature of about 0 to 4°C may be operating.

Within the display cabinet, the various meat cuts will be displayed and stored. Other necessary items in the shop will include the following:

- Various cutting knives for trimming, and cutting of meat.
- A small band saw for portioning bone-in cuts.
- Meat slicer for slicing meat cuts such as bacon, ham, sausages, etc.
- Stretch wrap films for wrapping meat.
- Weighing scale.
- Boning axe and hand saw for cutting through bones in a meat cut.
- Meat cutting table and boning block.

Usually there is a small separated room behind the shop floor where various cuts and other minor activities are carried out. This helps to keep the shop floor itself clean and tidy. Since meat in the displayed refrigerated cabinet will not keep the meat frozen, at best maintaining a temperature of about 0 to 4°C, there is a time limit to hold meat under such storage temperature conditions. On this basis the following below illustrates the time of storage against the temperature to guide you to know the limit of holding meat and meat products under specified temperature conditions under wholesome condition.

Type of meat	Expected storage life at (-1°C)
Beef	up to 3 weeks
Veal (young bull)	1-3 weeks
Lamb	10-15 days
Pork	1-2 weeks
Edible offals (eg. liver, kidney intestines, spleen etc.)	7 days
Rabbit	5 days
Bacon	4 weeks (at - 3°C)

Some commercial refrigerated cabinets will provide a higher temperature range than - 1°C (ie. 4 to 5°C). Under such conditions, the time stated above for wholesome storage may be considerably shorter.

NB: It is essential to have running water flowing at all times with the provision of a small sink in the meat preparation room for washing purposes. Operatives in the shop floor must be adequately dressed. Thus provision of a white overall, apron, hand gloves, head gear etc.

Thorough cleaning of the preparation room must be carried out at the end of each working day so is the floor and counter of the retail shop. Usually a mop can be used for the floor. Water for mopping may contain 5% hypochlorite for effective cleaning. Hypochlorite solution may also be applied to rinse cutting tables and rinsing of meat containers, knives and other equipment used in the retail shop.

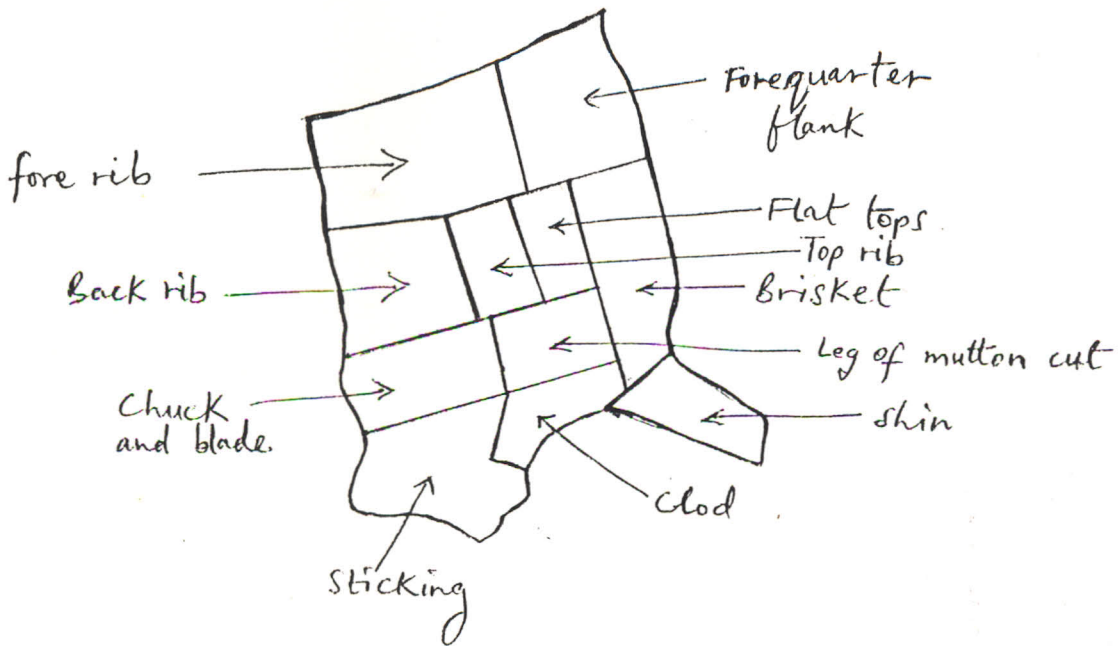
Meat cutting as a trade

The act of meat cutting into the various retail portions and preparations require skill. It is a skill which must be acquired on the job practically.

It will be best to obtain a core personnel or operative with adequate practical knowledge on meat cutting and deboning to start work with. This trained operative will then subsequently train other operatives practically on the job with time.

Attached are illustrated examples of various meat cutting techniques.

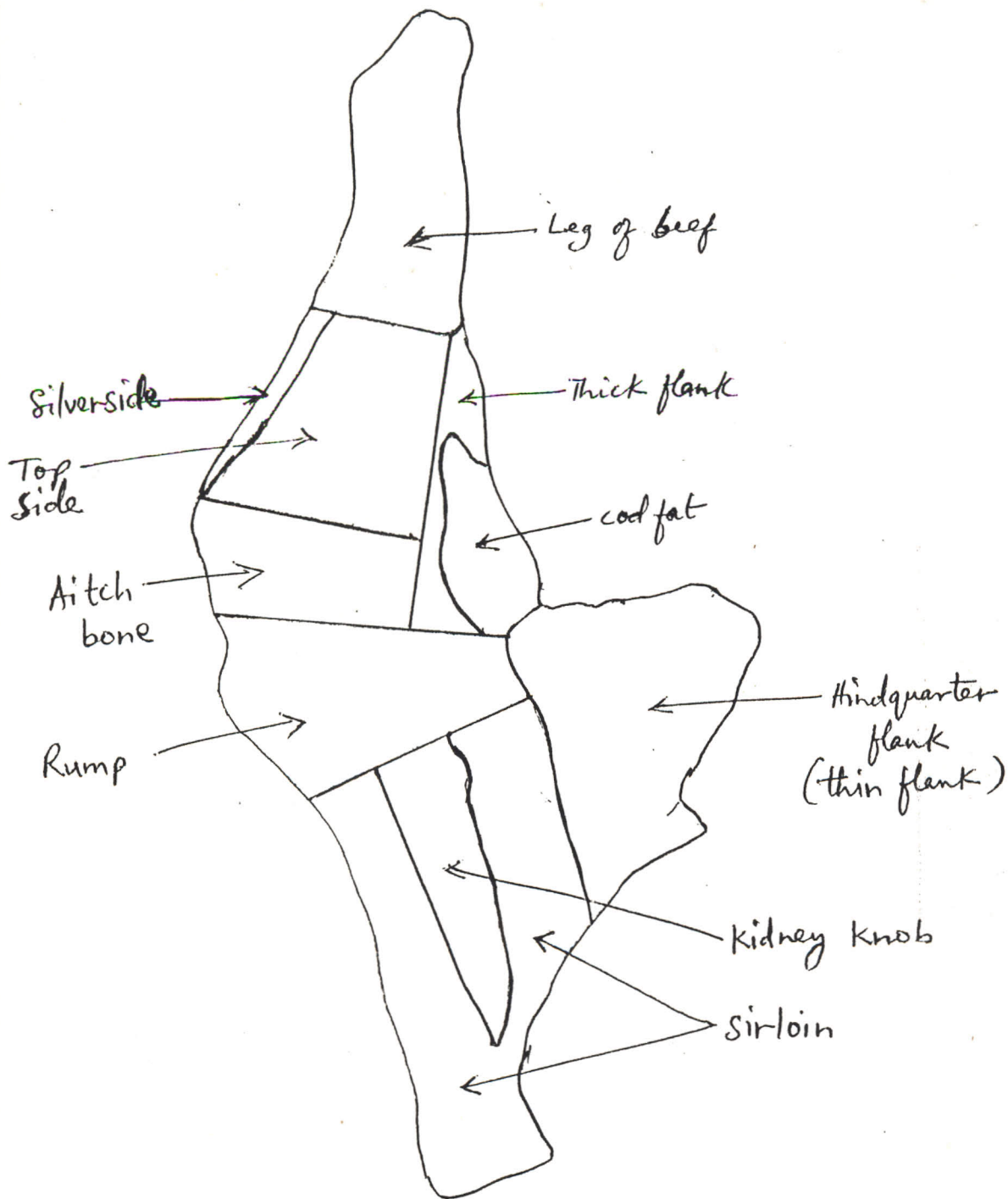
BEEF FOREQUARTER CUTTING (London cuts)



PERCENTAGE ANALYSIS FOR AN AVERAGE FOREQUARTER (BEEF)

CUT	WHOLE (BONE-IN) (%)	TRIMMED BONELESS MEAT (%)
i. Shin	5.5	3.1
ii. Clod	12.1	6.1
iii. Sticking	8.4	6.2
iv. Chuck	8.5	6.6
v. Blade bone	4.7	3.5
vi. Leg of mutton cut	7.3	5.6
vii. Back rib	10.5	6
viii Top rib	6.9	5
ix. Flat tops	2.6	1.8
x. Brisket	12.6	7.3
xi Flank	10.4	6.1
xii Fore rib	10.5	8.2

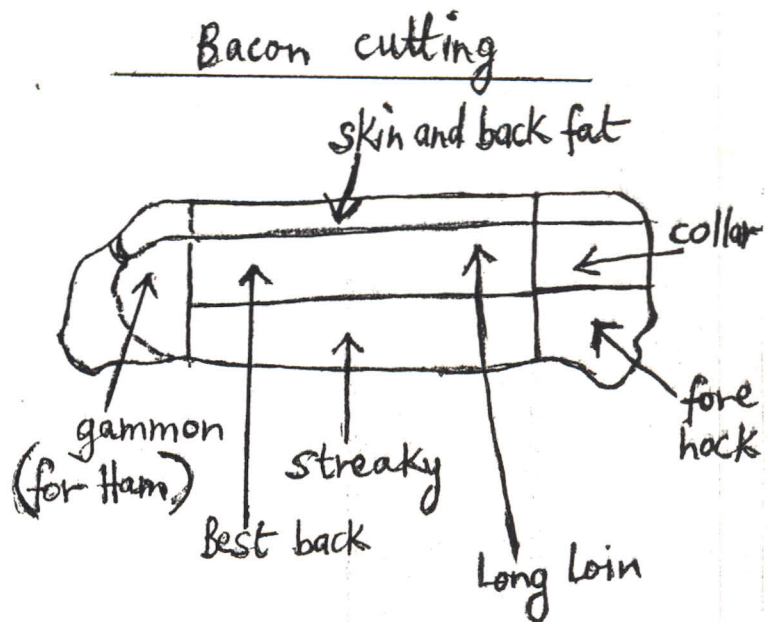
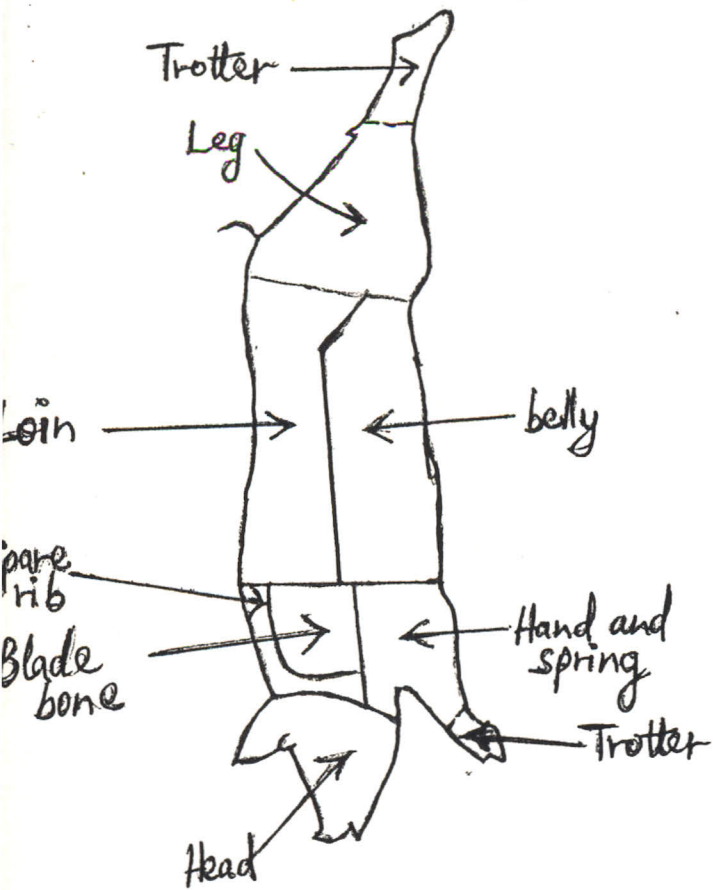
BEEF HINDQUARTER CUTTING (London cuts)



PERCENTAGE ANALYSIS FOR AN AVERAGE HIND QUARTER (BEEF)

CUT	WHOLE (BONE-IN) (%)	TRIMMED (BONELESS MEAT) (%)
i. Top side	13.8	(rolled) 11.0
ii. Silverside	13.7	" 9.8
iii. Thick flank	10.7	" 8.5
iv. Aitch bone	5.8	2.9
v. Leg	9.0	4.8
vi. Flank (thin flank)	8.0	7.5
vii. Rump	15.5	7.6
		(Fillet) 1.4
		Rump (Skirt) 0.8
viii. Sirloin	18.5	11.5
		Sirloin (fillet) 1.3
ix. Kidney knob	5.0	(Kidney) 0.7
		(Trimnings) 2.9

PORK CARCASS CUTTING (London cuts)



PERCENTAGE ANALYSIS FOR AN AVERAGE PORK CUTTING

EXAMPLE:

Live weight of animal	=	61kg.
Dressing percentage	=	69%
Carcass weight	=	42.1kg

CUT	Whole cut (bone-in)
	(%) Average.

i.	2 legs	-	25.9
ii.	2 loins	-	26.0
iii.	2 Neck ends (spare rib and blade bone)		14.8
iv.	2 hand and spring	-	11.1
v.	2 bellies	-	14.0
vi.	1 head	-	7.6
vii.	Losses	-	0.6

TOTAL			100.0%

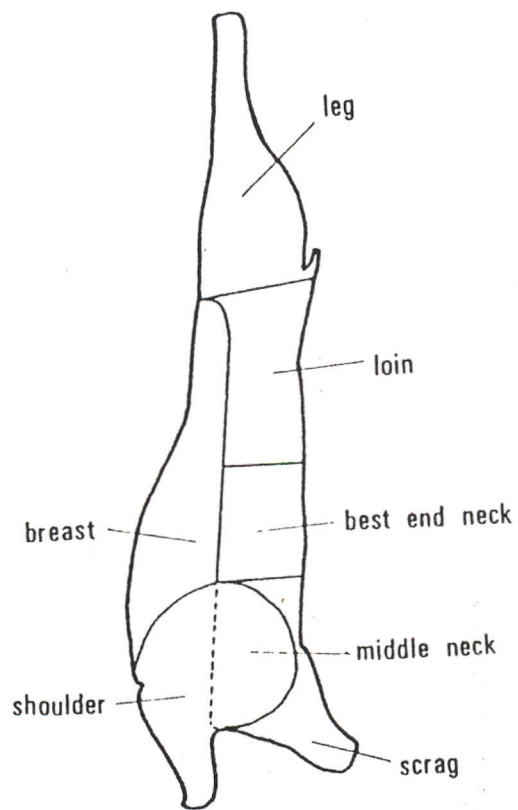
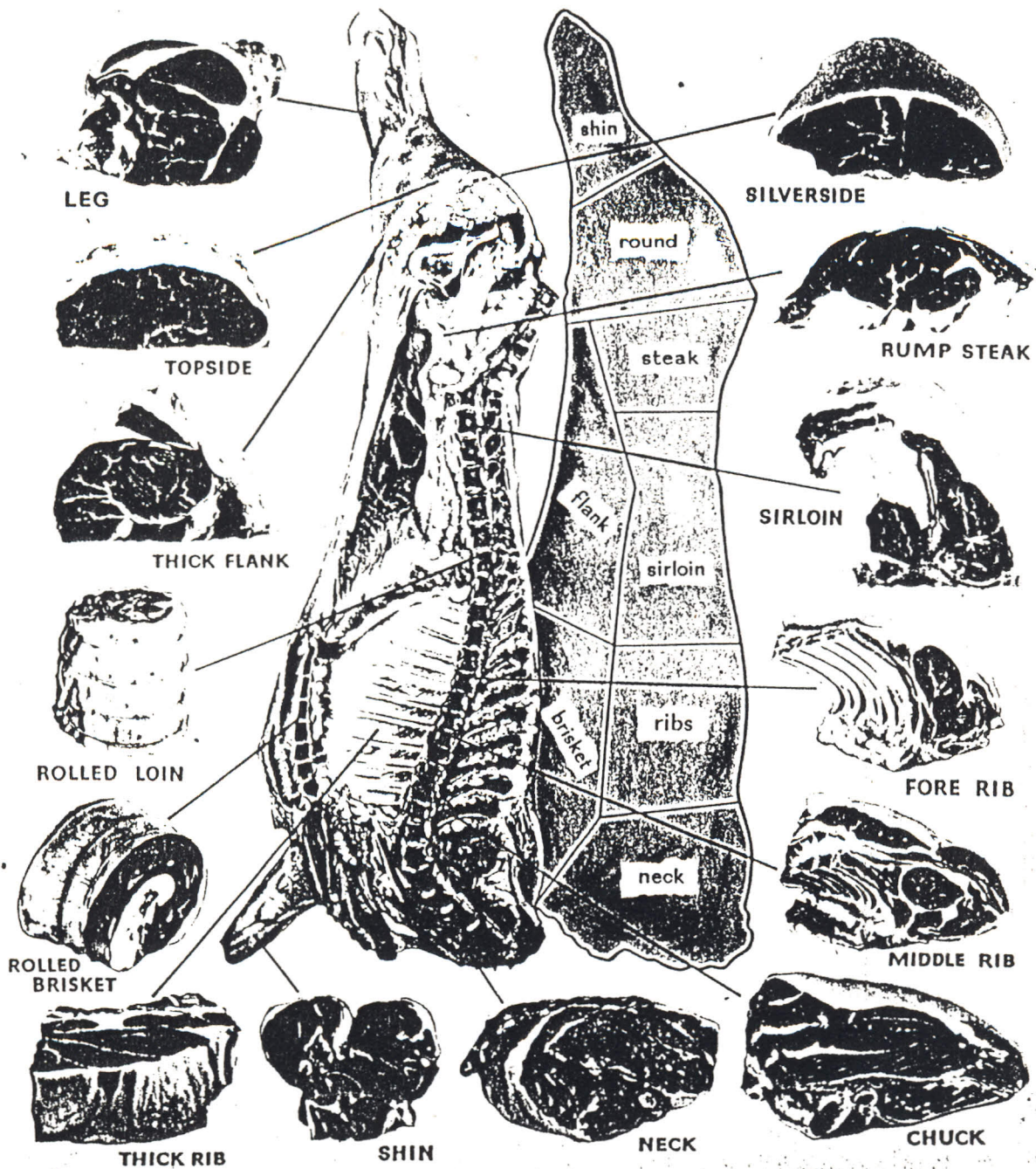


Fig. 3. London and Home Counties Cutting. (MUTTON).



Beef Carcase and Primal Cuts

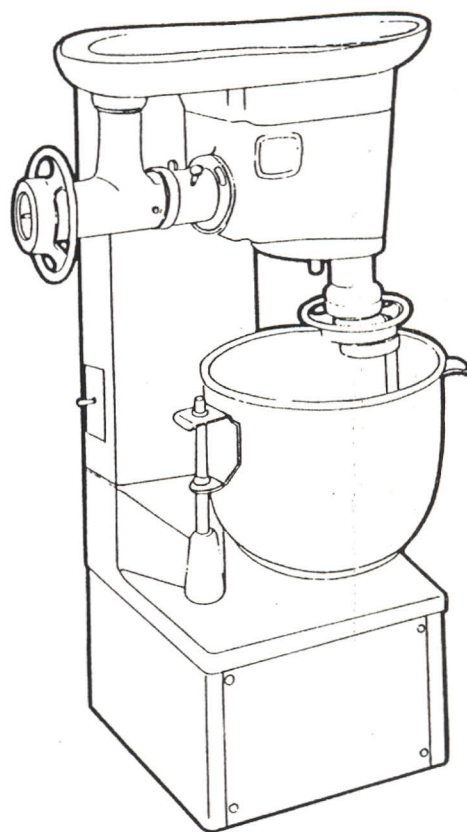
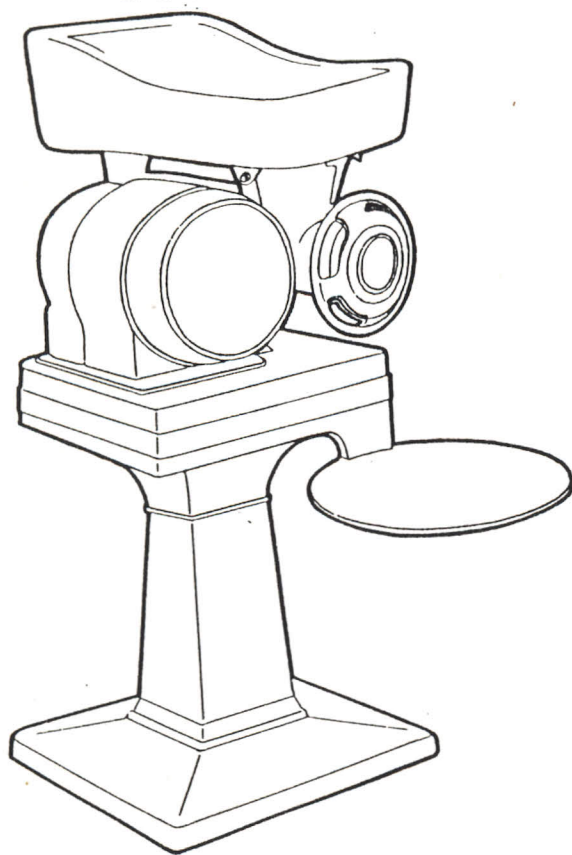
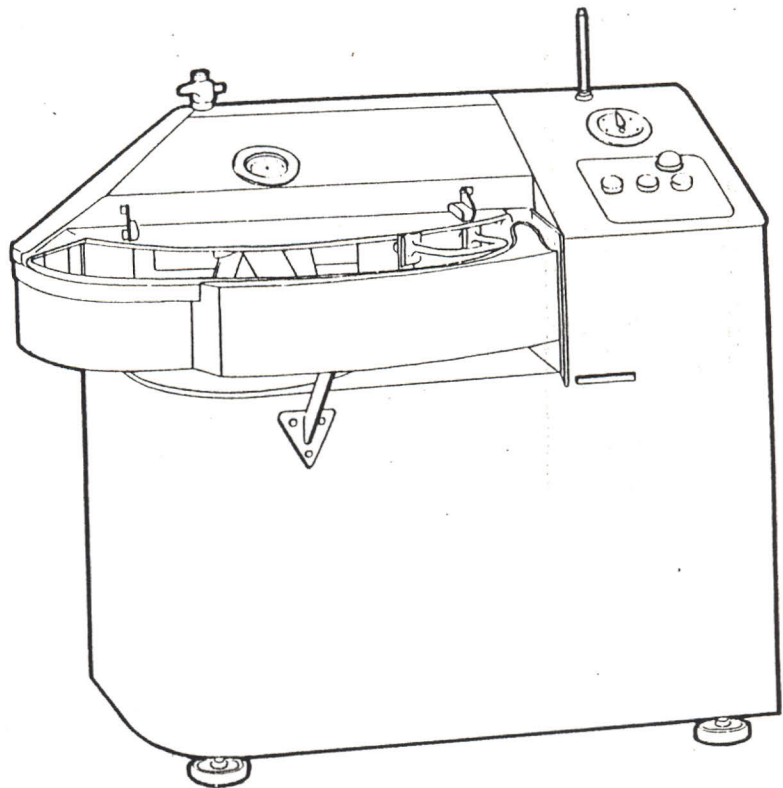


Fig. 2. Rotabowl for sausage making, 25 lb capacity.



Mincer, bench or pedestal machine with quick feed chopper head.

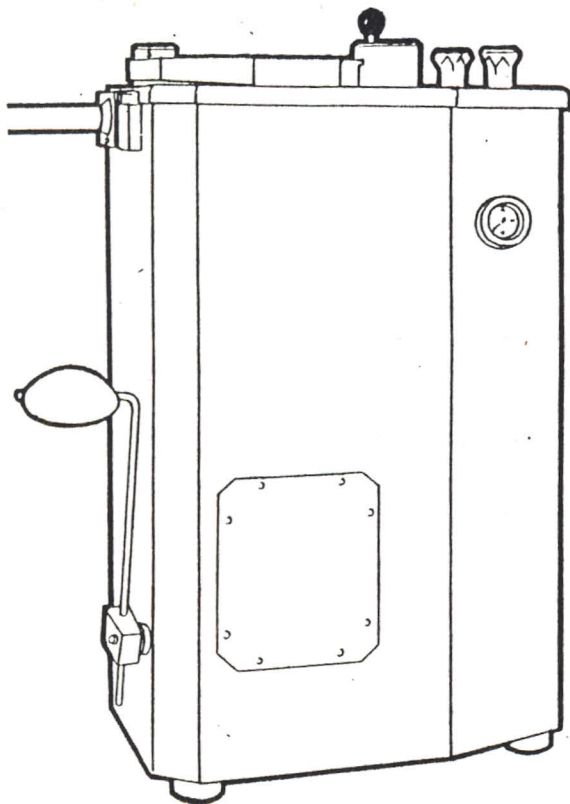


A modern filling machine for small and medium scale production. Special features include, quick release filling nozzle, which does not require locknut. Barrel lined with polished stainless steel and meat piston of high impact nylon. Two models are available.

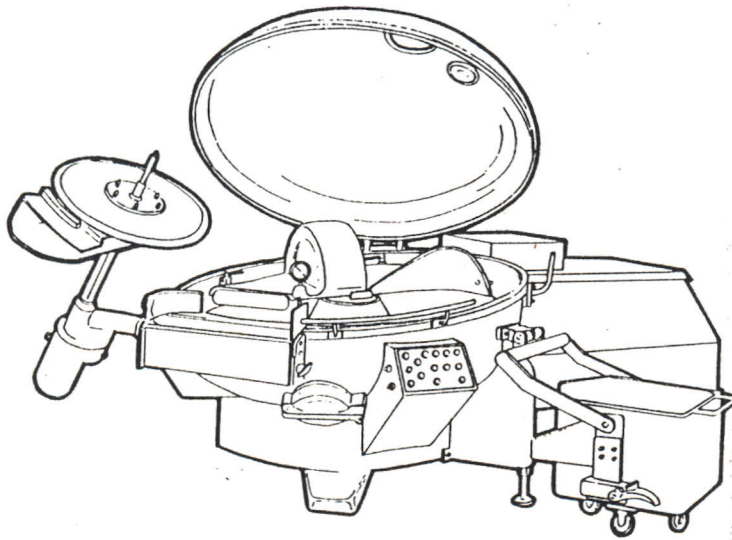
	A	B
Capacity	40 lbs. (20 ltrs.)	60 lbs. (30 ltrs.)
Motor	1.5 kW (2 HP)	2.2 kW (3 HP)
Output per. min., max.	38 ltrs.	48 ltrs.

Both models are available in three finishes.

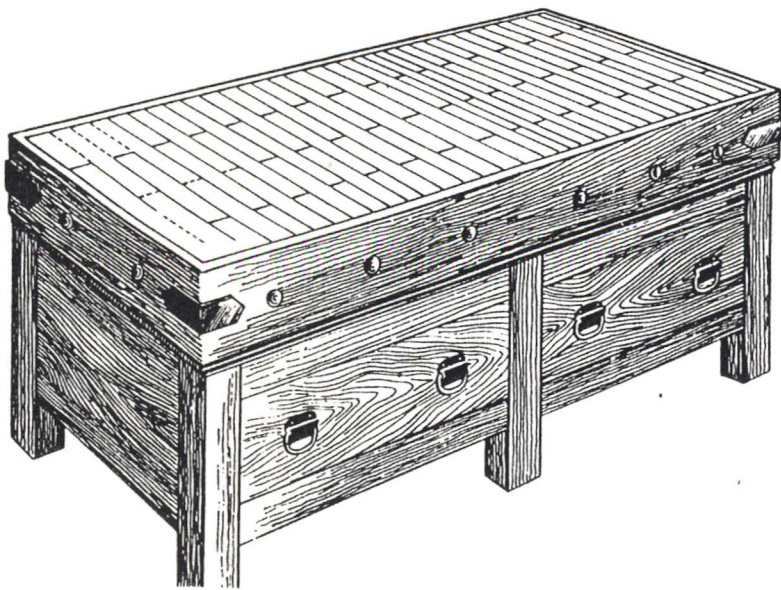
(Courtesy J. C. Wetter & Co.)



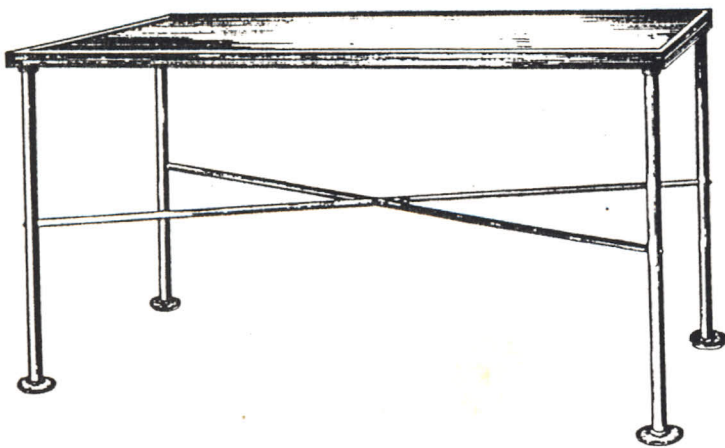
Cutter-Mixer from 33 to 80 litre capacity for production of all types of cooked and raw sausage.



*Vacuum Cutmix—hydraulic loading, over-the-side unloading
200, 300, 500 litre capacity.*

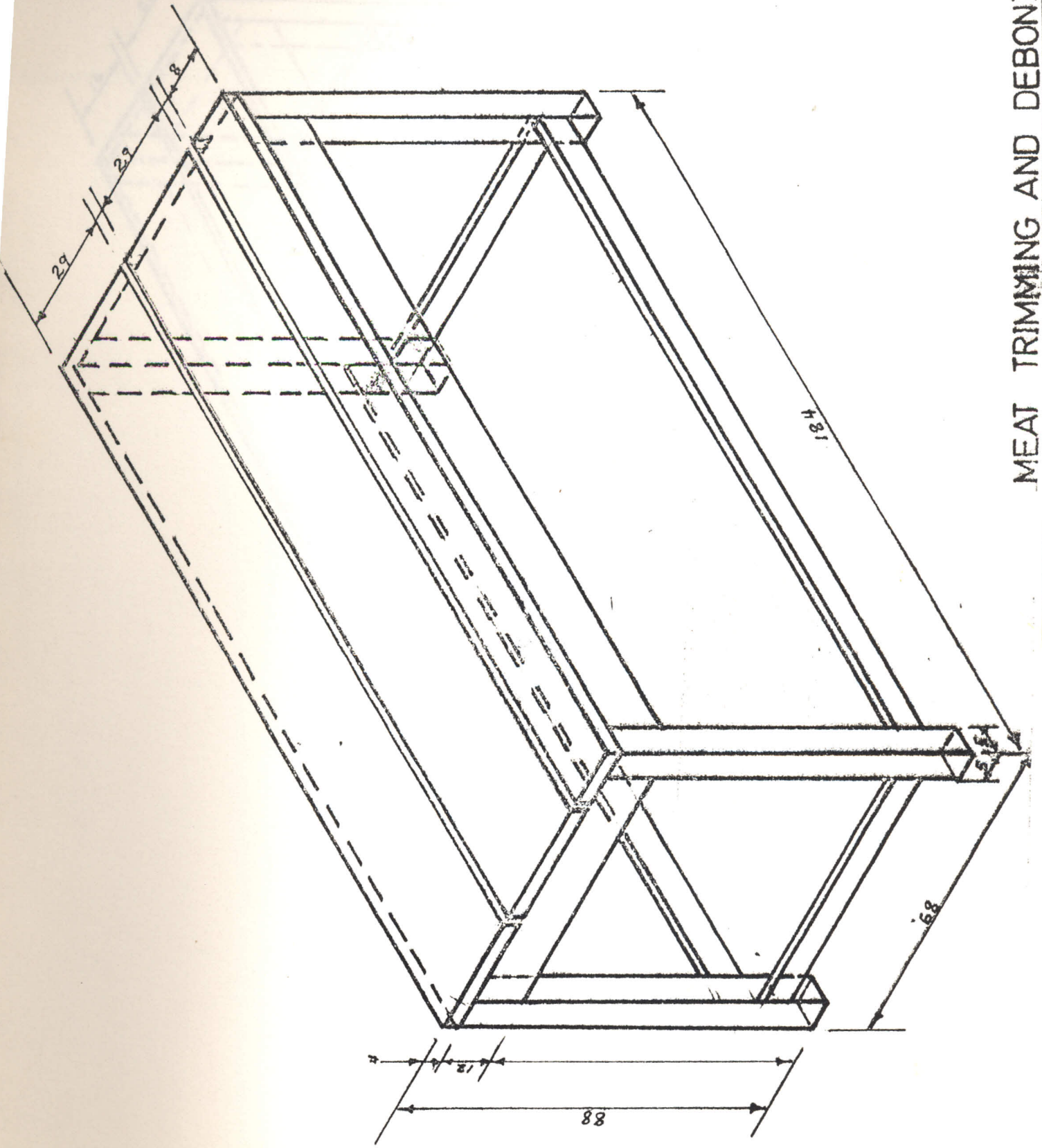


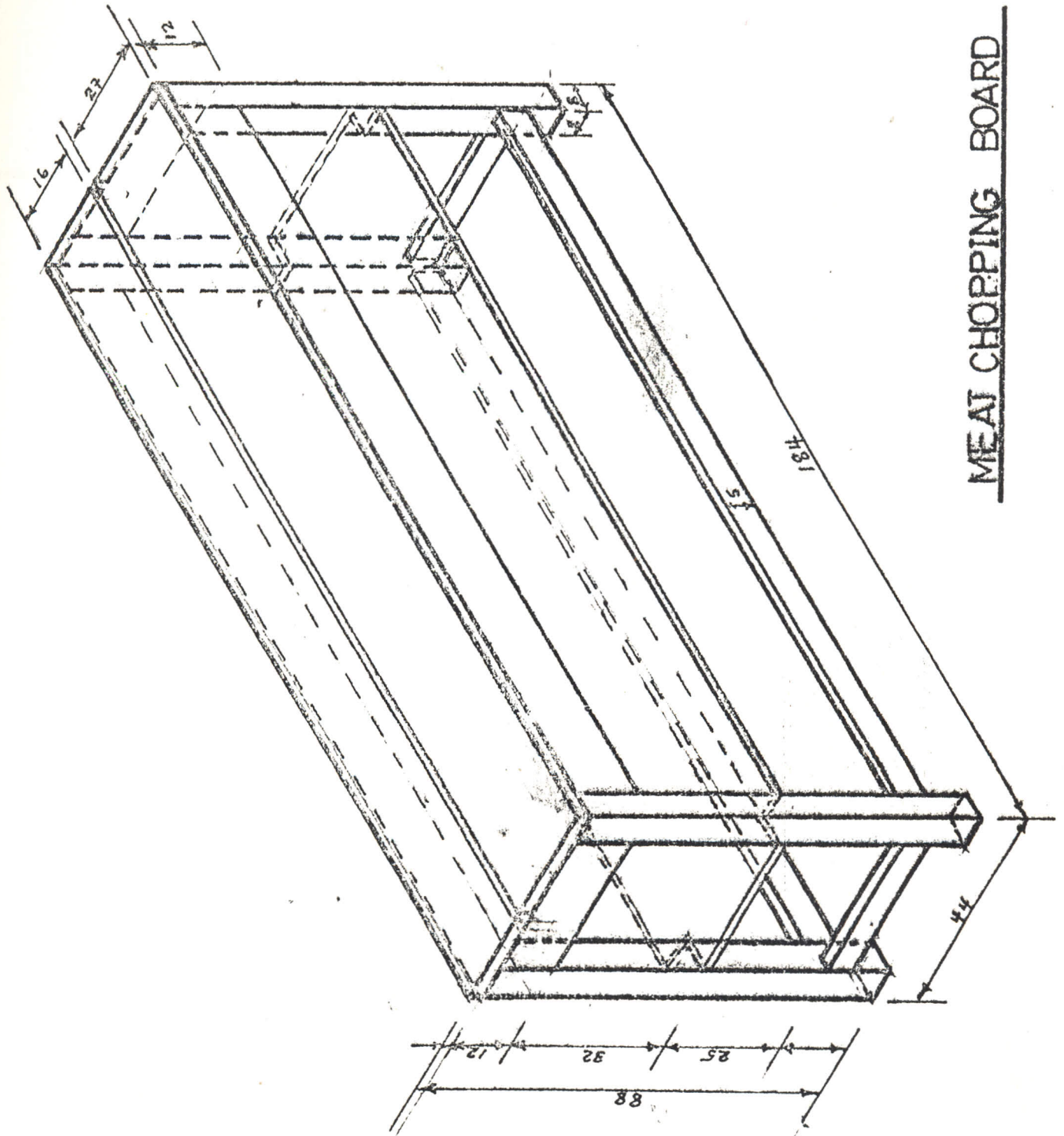
"Albion" reversible hardwood block: all joints morticed, tenoned and dowelled.



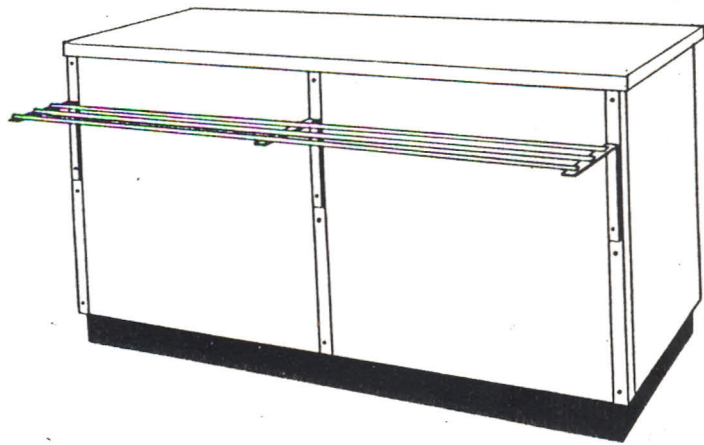
Stainless steel table: suitable as a filling out table for sausage—centre driphole carries off moisture. Adjustable base flanges compensate for uneven flooring.

MEAT TRIMMING AND DEBONING BOARD

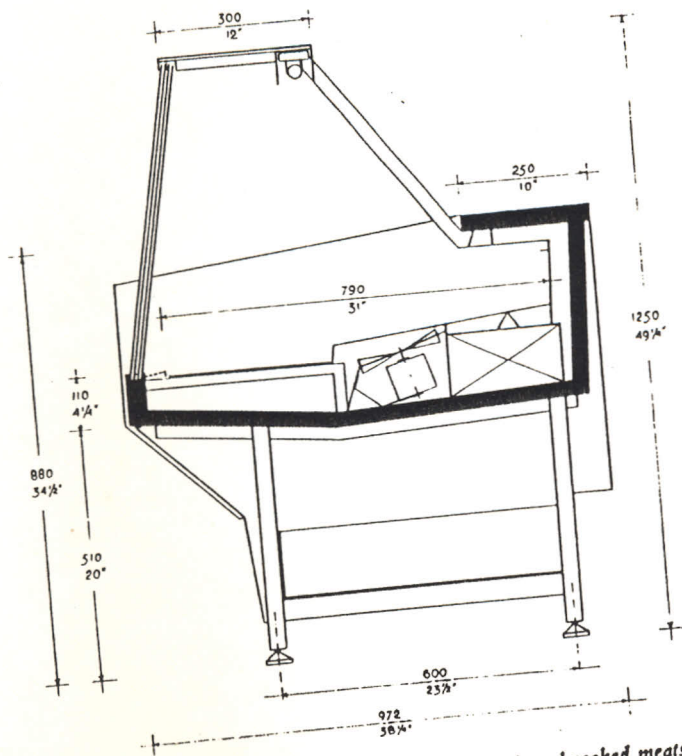
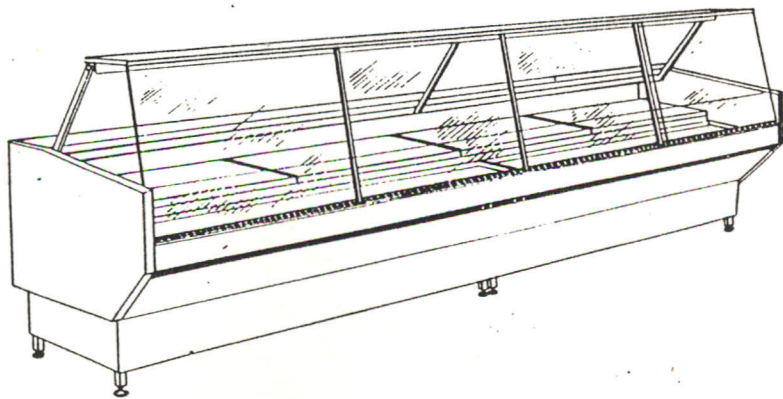




MEAT CHOPPING BOARD



Metal framed counter. White cleanoid panels secured with polished stainless steel angles and strips to heavy angle iron frame.



Forced air cooled display cabinet for fresh and cooked meats,
thermostatically controlled.