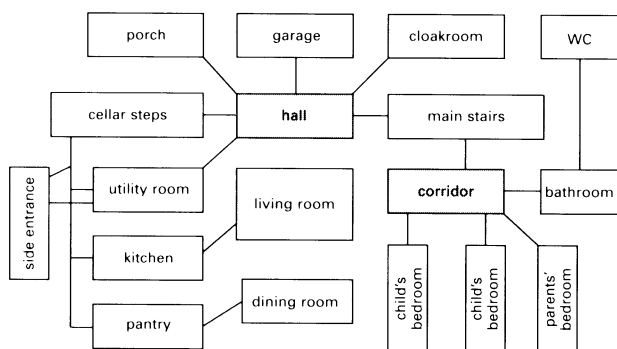


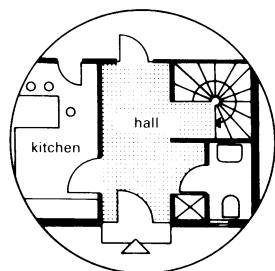
HOUSES: PORCHES AND ENTRANCE HALLS

Porches play a crucial part in sheltering the entrance hall from inclement weather conditions. They should be designed as far as possible with the prevailing local wind direction taken into account. In addition, they should be visible from the street or garden gate.

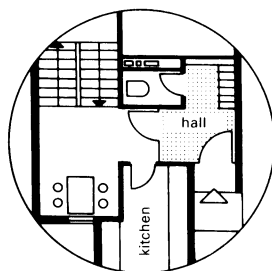
The key rooms with the highest levels of circulation, and, in particular, stairways, should be immediately accessible from the hall → ② – ④. For instance, an effective design could have the hall providing a direct connection between the kitchen, stairs and WC → ⑧.



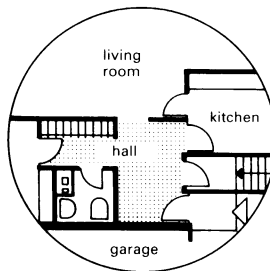
① Relationships between rooms



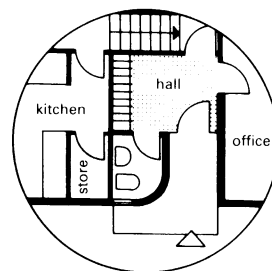
② Central entrance



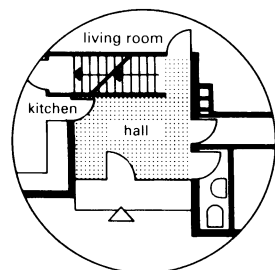
③ Side entrance



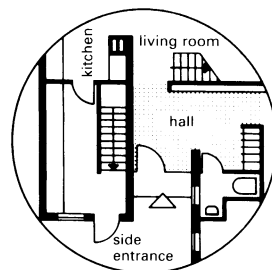
④ Entrance adjacent to cellar steps



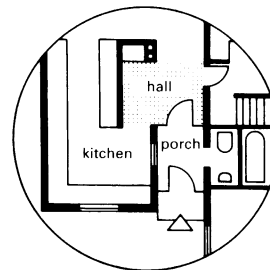
⑤ Hall adjacent to office room



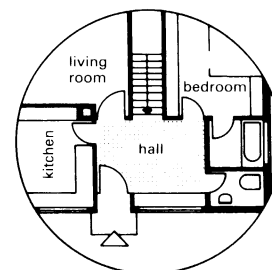
⑥ adjacent to cellar steps



⑦ adjacent to living room



⑧ adjacent to porch

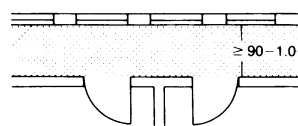


⑨ adjacent to kitchen, WC, cellar steps, bathroom and bedroom

CORRIDORS

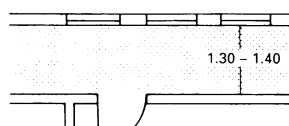
Where a long corridor is necessary, the width is established according to its position, whether the doors are on one or both sides, the arrangement of the doors, and the anticipated volume of circulation. Appropriate corridor widths are shown in → ⑩ + ⑪.

If possible all doors should open into the rooms.

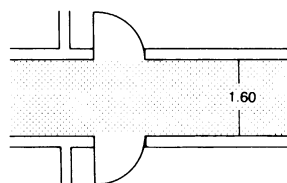


doors on one side and low level of traffic: minimum width of 0.9m required (1.0m is better)

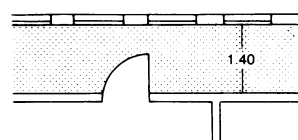
⑩ Corridor with doors opening into the rooms



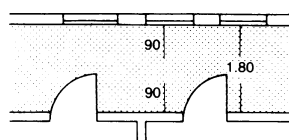
doors on one side, and wide enough for two people to pass one another unhindered: width 1.30 to 1.40m



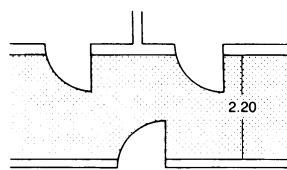
doors on both sides, large volume of traffic: 1.6m width to allow two (2.0m or more for three) people to pass each other comfortably



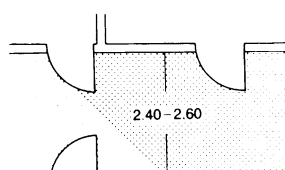
doors on one side, low traffic: corridor width = door width plus 50 cm



doors on one side, heavy traffic



offset doors on both sides, heavy traffic

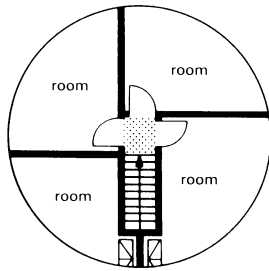


doors opposite one another on both sides

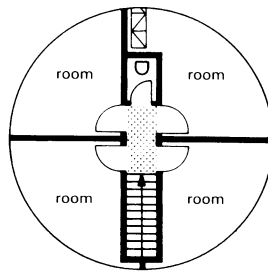
⑪ Doors open into these corridors

LANDINGS AND HALLWAYS

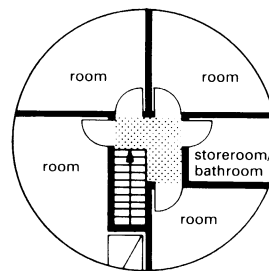
Floor areas required for different numbers of rooms



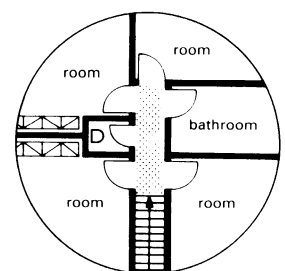
① 1 m² landing serving three large rooms at end of staircase, no continuation



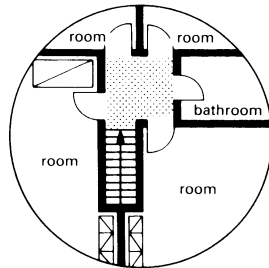
② 2 m² landing serving four large rooms and WC (best use of space, good layout)



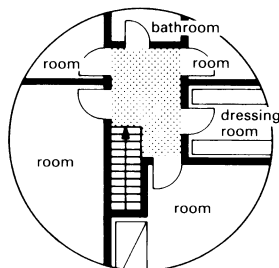
③ 3 m² landing, as ④, with store/bathroom but no WC (open stairway gives appearance of 4 m² landing)



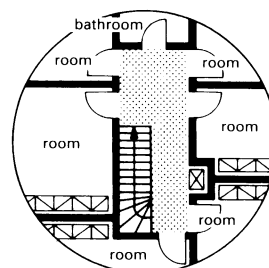
④ 3 m² landing serving four large rooms, a small one (e.g. bathroom) and a WC



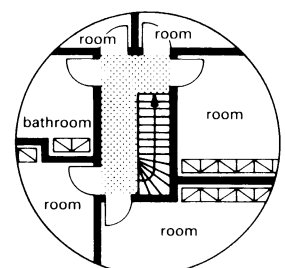
⑤ 4 m² landing, similar to ③ + ④, serving no more rooms but with better plan



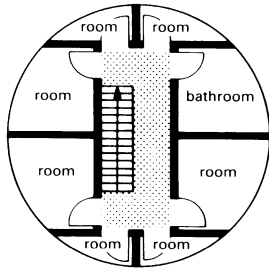
⑥ 5 m² landing serving four large and two small rooms



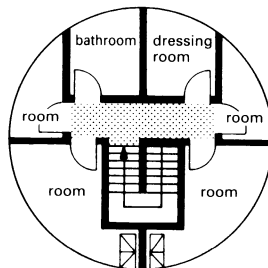
⑦ 7 m² landing serving six large rooms and one small one



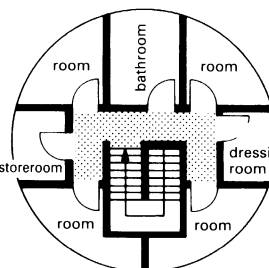
⑧ 5 m² landing serving five rooms and a bathroom



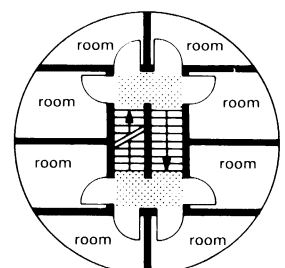
⑨ 7 m² landing serving eight rooms



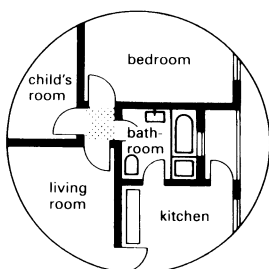
⑩ 4 m² landing serving four rooms, a bathroom and a dressing room



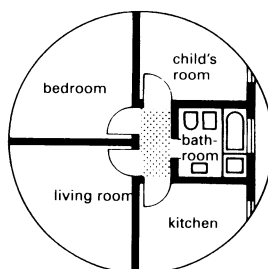
⑪ 6 m² landing serving four rooms, a bathroom, dressing room and storeroom



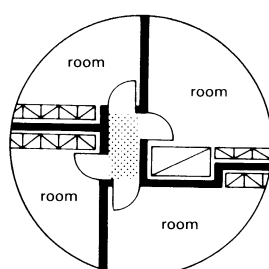
⑫ 4 m² landing serving eight rooms, with split-level floors (best use of staircase areas)



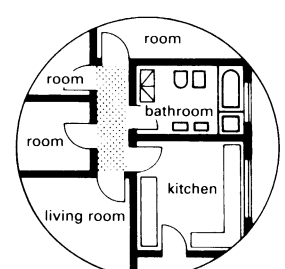
⑬ 1 m² hallway serving four rooms, separating the bedroom, children's room, bathroom and living room



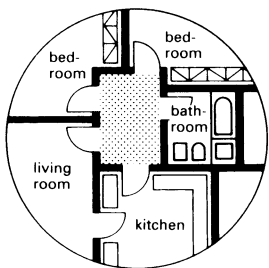
⑭ 2 m² hallway serving three rooms; otherwise like ⑬



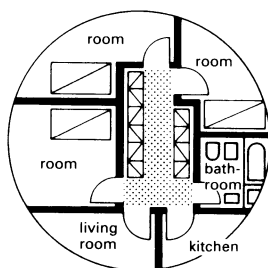
⑮ 2 m² hallway serving four rooms with fitted wardrobes and cupboards



⑯ 3 m² hallway serving six rooms: kitchen, bathroom, three bedrooms and a living room



⑰ 4 m² hallway serving five rooms, some with fitted wardrobes



⑱ 5.2 m² hallway with built-in cupboards serving six rooms

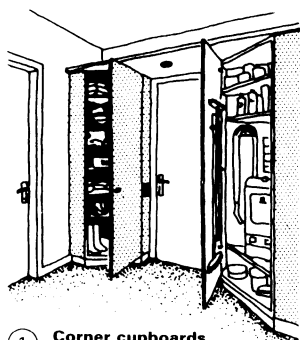
These figures show the arrangement and number of doors to rooms that are 2m wide or more for different sizes and shapes of landing and hallway. The layouts giving the most economical use of space are shown in ④, ⑧, ⑫ and ⑯. The majority of these examples are based on an aisle width of 1m, which is suitable as a minimum because two members of a family can still pass one another. This width does not, however, leave enough space for built-in cupboards, which are often desirable → ⑱. Enlargement of a landing or hallway at the expense of room size can allow better door arrangements and not make the rooms feel any less spacious → ⑰.

STORAGE SPACE

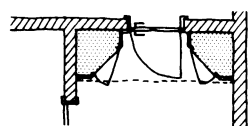
Corners behind doors and spaces under stairs and sloping roofs can all be used to provide storage space.

The easiest space to exploit is under the staircase, where there is often room for large sliding cupboards → ⑥ or even a work space → ⑧.

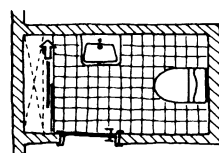
Where cupboards are built into spaces under roof slopes it is important to ensure good insulation must be provided behind the units. Such cupboards should also have air holes at the top and bottom, or have louvre doors → ⑬ – ⑮, so that there is constant ventilation.



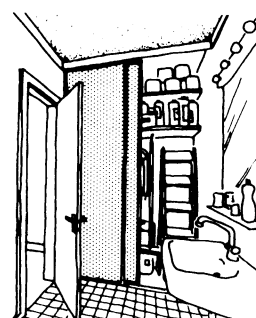
① Corner cupboards next to side door



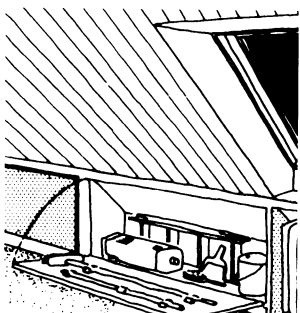
corner cupboards → ①



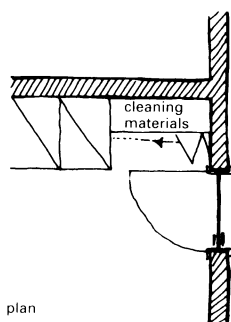
② Cupboard in the WC → ③



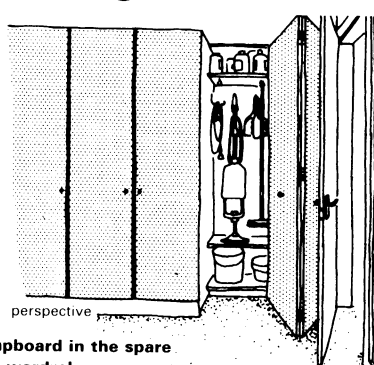
③ Cupboard in the WC → ②



④ Equipment storage in the roof space

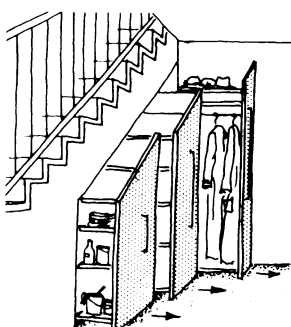


plan

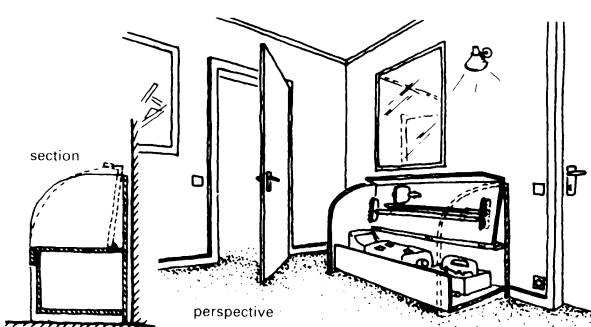


perspective

⑤ Cleaning materials cupboard in the spare space next to a fitted wardrobe



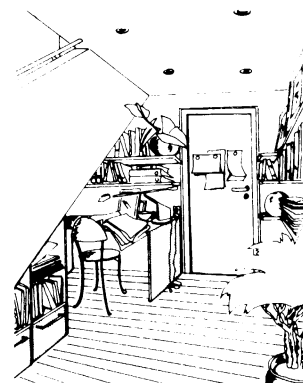
⑥ Sliding cupboards under the stairs



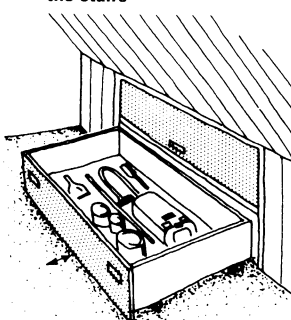
section

perspective

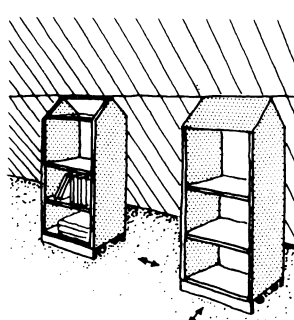
⑦ Box bench for cleaning materials and equipment



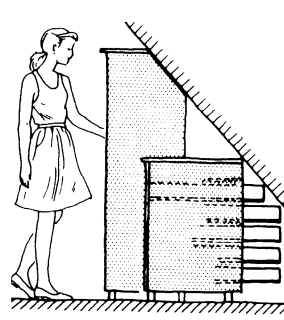
⑧ Work space under the stairs



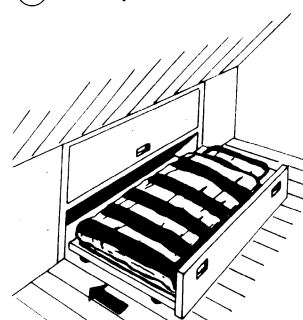
⑨ Drawers in the roof space



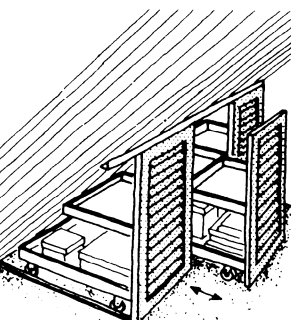
⑩ Shelves on rollers under the roof slope



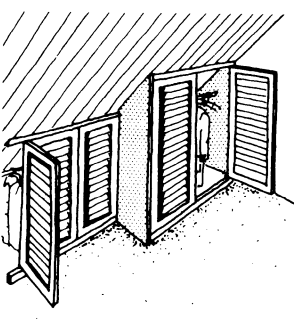
⑪ Extended drawers can be used under the roof slope



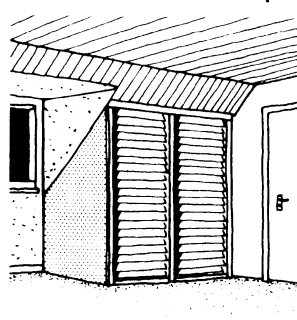
⑫ Sliding bed stored in roof space



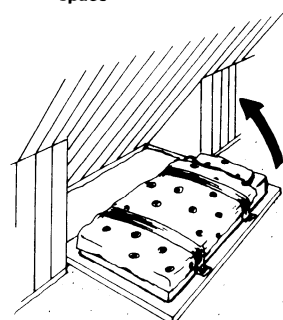
⑬ Sliding cupboards in the eaves



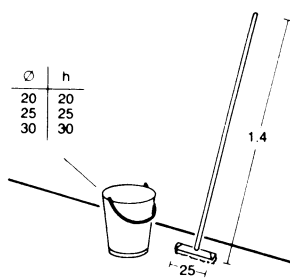
⑭ Roof-space cupboards with louvre doors



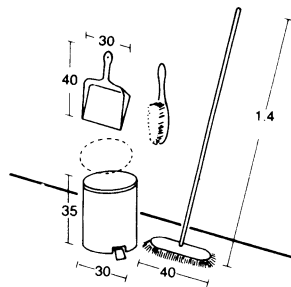
⑮ Roof-space cupboards next to the dormer



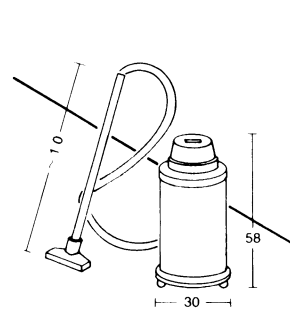
⑯ Folding bed under a steep roof slope



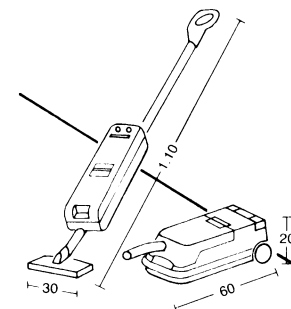
① Dimensions: bucket and long-handled brush/mop



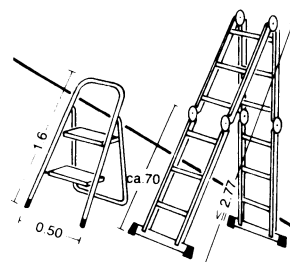
② Dimensions: waste bin, broom, dustpan and brush



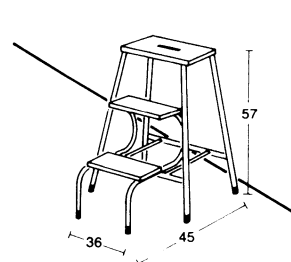
③ Multipurpose vacuum cleaner



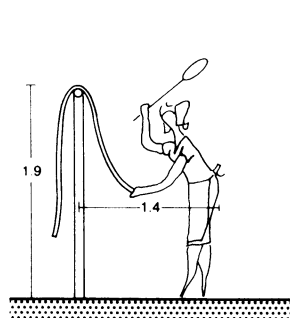
④ Vacuum cleaners



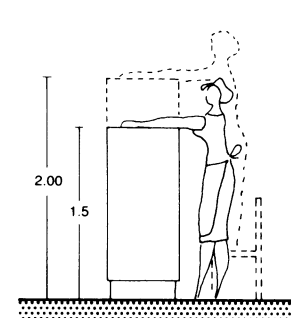
⑤ Folding step-ladders → ⑩



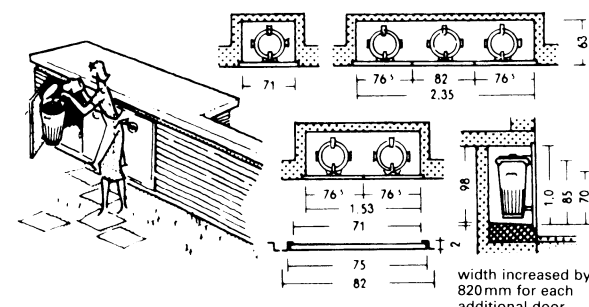
⑥ Stepping stool



⑦ Carpet-beating bar



⑧ Useful cupboard height



⑨ Space requirement for enclosed external waste bins

In utility rooms there must be adequate cupboard space for storing cleaning materials and equipment, tools and ladders → ① – ⑥. Each cupboard should, if possible, be no less than 60 cm wide.

In some circumstances, and particularly in multistorey housing units, chutes made of stainless steel or galvanised steel sheet can be used for discharging household waste or collecting laundry → ⑪ – ⑬. They will require a ventilation shaft with a cross-sectional area of 30–35% of the waste chute. For safety, chute insertion points can have electrical doors so that only one load at a time can be dropped.

Linen chutes are most likely to be worth considering in houses on sloping sites with utility rooms in the basement.

Household waste should ideally be collected and transported in portable containers → ⑬ + ⑮, the dimensions of which need to be taken into account when planning the standing and movement areas required. These intermediate waste containers are made of steel sheet or polyethylene and have capacities up to 110 m³ (1100 l). More common household dustbins of polyethylene or galvanised sheet steel are free-standing and have no wheels → ⑭. They range from 50 to 110 l capacity and can be contained in a purpose-built outhouse → ⑨.

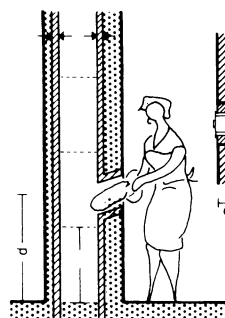
rungs	for room height (mm)	side rail length (mm)
3	2400	1350
4	2600	1580
up to 8	3500	2540

rungs	for room height (mm)	side rail length (mm)
12	3630	1710
16	4750	2250
20	5870	2770

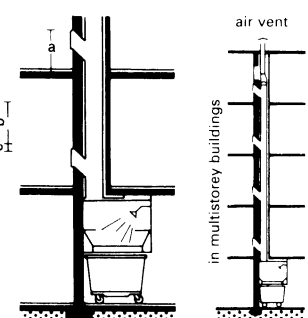
⑩ Ladders

	shaft dia. (cm)		minimum dimension (cm)				
	chute	air vent	a	b	c	d	e
loose household waste	40+45	25	55	55	24	95	
waste in bags (110 l)	50	30	60	60	24	130	
paper (office waste)	55	30	65	65	24	110	
linen (family house)	30	15	35	35	11.5	110	
linen (larger units such as flats, hostels, hotels or hospitals)	40	25	45	45	11.5	110	fire-resistant
	45	25	50	50	11.5	110	
	50	30	55	55	11.5	110	

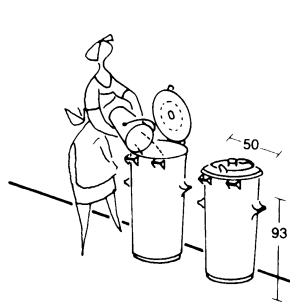
⑪ Waste disposal and laundry collection systems → ⑫ + ⑬



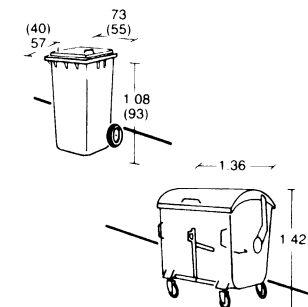
⑫ Waste disposal in bags



⑬ Waste/collection container in cellar

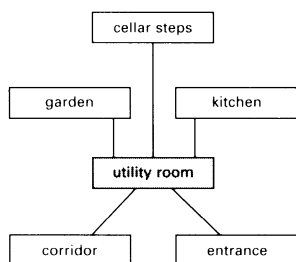


⑭ Dustbins



⑮ Large bins (intermediate waste containers)

UTILITY ROOMS



1 Arrangement for utility rooms

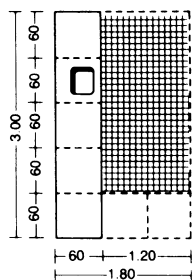
fittings/ equipment	width, min (cm)	better
automatic washing machine and dryer (upright unit)	60	60
wash-basin with water heater	60	60
dirty laundry container	50	60
worktop for folded linen	60	1.20
ironing surface	ca. 100	1.00
storage cupboard	50	60
total	ca. 380	4.60

2 Standing space required for equipment

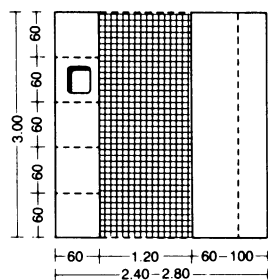
The best position for utility rooms is facing north. They should ideally be near the side or rear door and be adjacent to or accessible from the kitchen → 7 - 10.

Utility rooms are used for a variety of purposes, including storage, laundry and ironing, sewing and possibly also for hobby activities. To be of real value, the length available for standing space or work surface should be a minimum of 3.80m (preferably 4.60m) → 2.

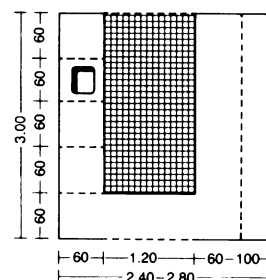
The arrangement of the equipment should allow safe and convenient use: for example, an ironing board when used standing needs to be at a different height than when seated → 12 - 13.



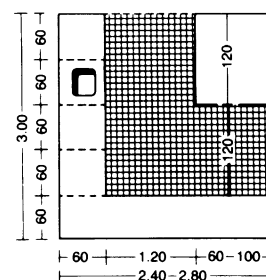
3 Single-sided domestic utility room (L shape)



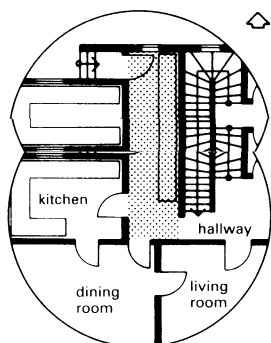
4 Double sided



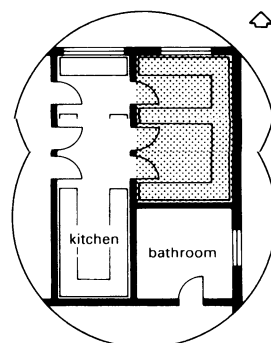
5 U shape



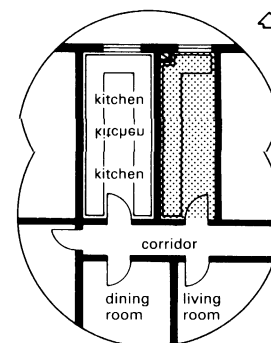
6 L shape



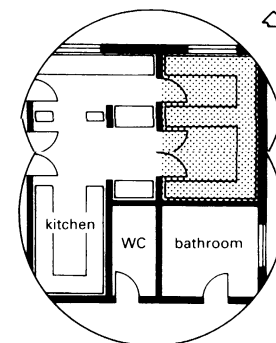
7 Utility room at side entrance



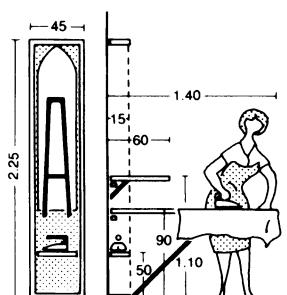
8 Accessible from kitchen



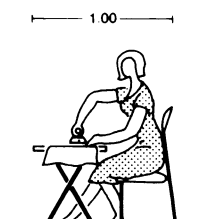
9 Beside kitchen, accessible from corridor



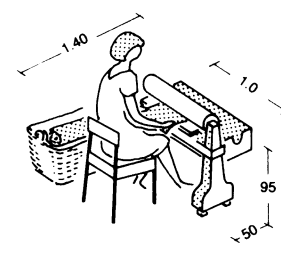
10 Behind kitchen and bathroom



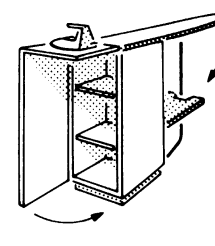
11 Hinged ironing boards on wall or in cupboard



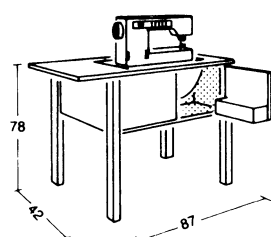
12 Space requirement when ironing seated



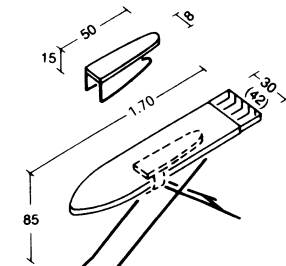
13 Electrical clothes press



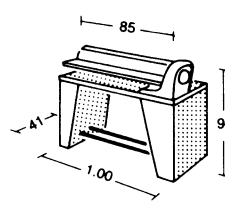
14 Ironing combination, collapsible



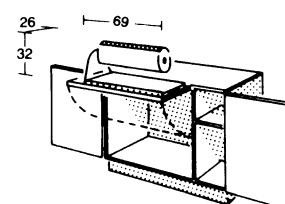
15 Sewing machine



16 Ironing and sleeve pressing board

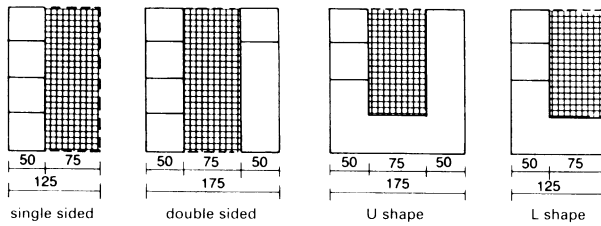


17 Electrical ironing machine



18 Ironing machine built into cupboard

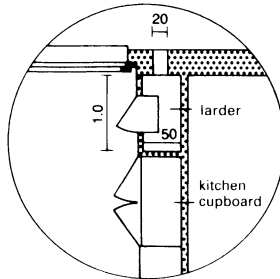
PANTRIES, LARDERS



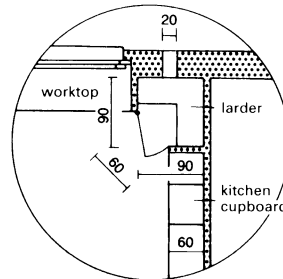
① Typical larder plans

When planning houses or flats, space should be allocated for rooms such as larders, pantries or cold stores. The most practical solution is to have a larder in or beside the kitchen → ② – ⑧. It must be cool, well-ventilated and shaded from the sun. Connections for a freezer unit and a drinks cooler should also be provided if the larder is of sufficient size and storage shelves are best arranged right up to the ceiling.

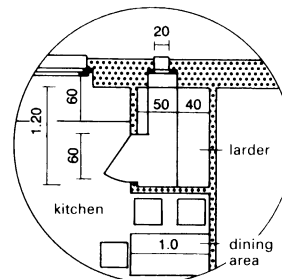
In very large households, there may be a need for a cold store. These are supplied in modular form in a range of sizes → ⑨ and include separate cooling and freezer sections.



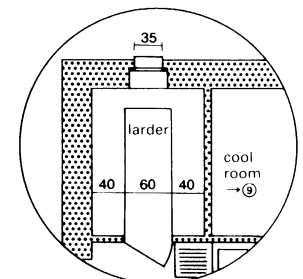
② Larder and cupboard



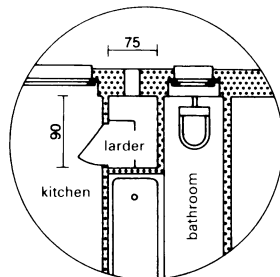
③ Corner larder



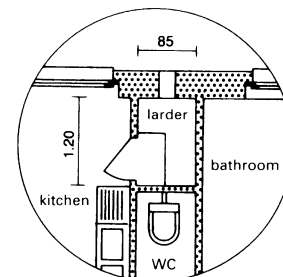
④ Larder behind dining area



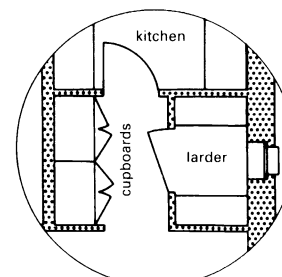
⑤ Spacious larder



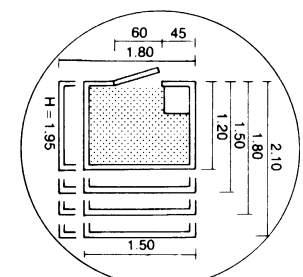
⑥ Space-saving larder adjacent to bathtub recess



⑦ As ⑥ but adjacent to WC



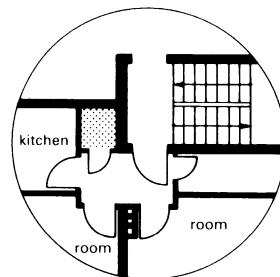
⑧ Larder by kitchen entrance



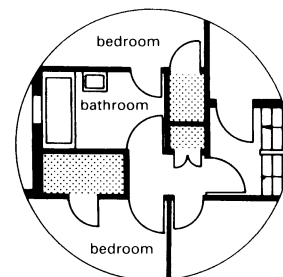
⑨ Sizes of cold stores (useful area 1.23–3.06 m²)

STORAGE

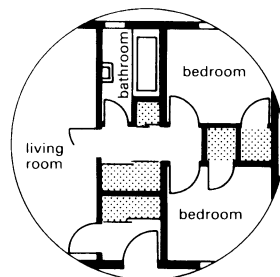
Apart from the cellar and attic rooms there should be at least one storeroom (1 m² or more, with a minimum internal width of 75 cm and good ventilation) in the house. For larger dwellings at least 2% of the living area should be planned as storage room. The space is needed for storing cleaning equipment and materials, tools, ironing board, shopping baskets and bags, cases, stepladder etc. Doors should open outwards to give more space and internal lighting must be provided, perhaps by a contact switch on the door. A recess close to kitchen for built-in cupboards is desirable → ⑬.



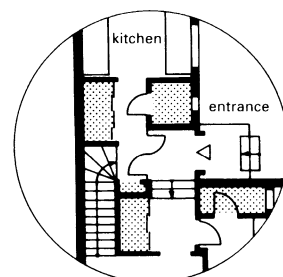
⑩ Storeroom in hallway



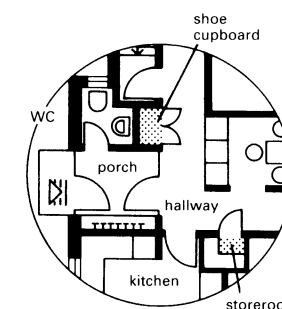
⑪ Storerooms in bedrooms and hallway



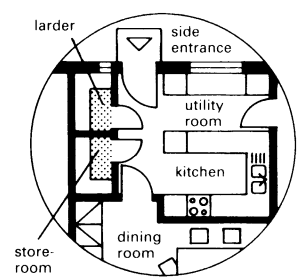
⑫ Storerooms and cupboards



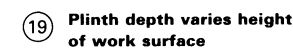
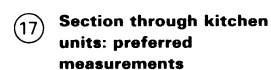
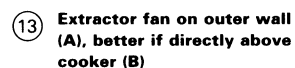
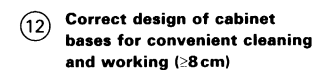
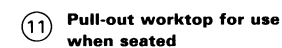
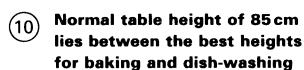
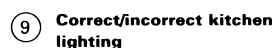
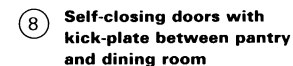
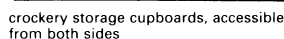
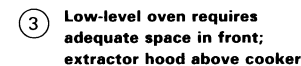
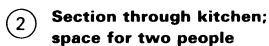
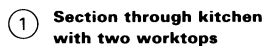
⑬ Storerooms in entrance area



⑭ Storeroom and shoe cupboard in entrance area



⑮ Larder and storeroom in kitchen area



KITCHENS

Built-in and Fitted Units

Despite increasing standardisation, the dimensions and manufacturing ranges of kitchen fittings still vary considerably. Built-in units are generally available from 20–120 cm (in 5 cm steps), usually with a height of 85 cm.

In an architect-designed kitchen, the various elements are assembled in a way that cannot be altered, with worktops and storage surfaces, possibly including an electric oven (with cut-outs for hotplates) and a continuous cover plate.

The materials used in kitchen units include, wood, plywood, chipboard and plastic. Exposed wood surfaces are varnished or laminated with plastic. Shelves are of wood or plastic-coated chipboard; metal shelves are best for pots and pans. Sliding or folding doors are useful if space is restricted because they require no additional space when opened.

Floor units → ① + ② are for storing large, heavy or seldom-used kitchen equipment. Wall-mounted cabinets → ③ + ④ have a small depth so that the worktops beneath them can be used without hindrance. They allow crockery to be reached without bending.

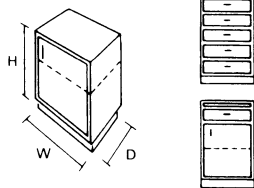
Full-height cupboards → ⑤ can be used for storing cleaning materials, brooms etc. but are also suitable for housing refrigerators, ovens, or microwaves at a convenient height.

Sinks and draining boards should be fitted into floor units, which may also include a waste bin, dishwasher and disposal units (and, if necessary, an electric water heater).

Special equipment, such as retractable breadbins with universal cutting board, equipment cupboards with special pull-out or hinged compartments, retractable kitchen scales, spice drawers, pull-out towel rails etc., save time and effort.

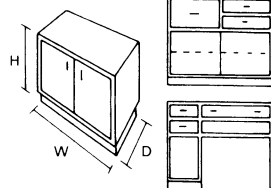
An extractor above the cooker is recommended → ⑫ and extractor hoods are most suitable for this task. There is a differentiation to be made between air extraction and recirculation systems. Extractor systems require a vent to the outside but are more effective than recirculation systems and so are the preferred type.

H(cm) × W(cm) × D(cm)
85 20–60 60



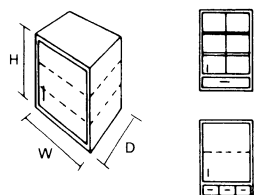
① Single floor unit

H(cm) × W(cm) × D(cm)
85 70–150 60



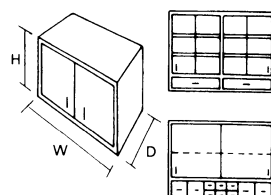
② Double floor unit

H(cm) × W(cm) × D(cm)
35 20–120 35
65
100



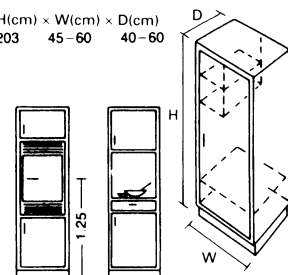
③ Single wall-mounted unit

H(cm) × W(cm) × D(cm)
50 70–150 35
65
100



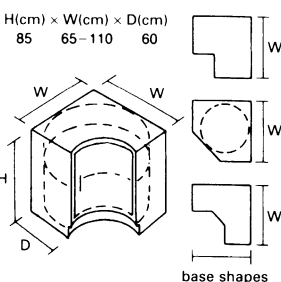
④ Double wall-mounted unit

H(cm) × W(cm) × D(cm)
203 45–60 40–60

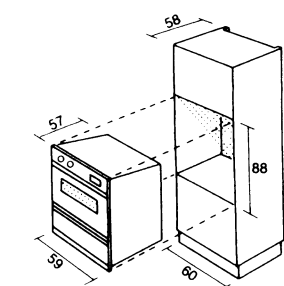


⑤ Full-height cupboards

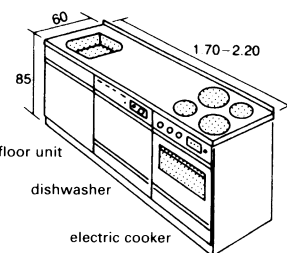
H(cm) × W(cm) × D(cm)
85 65–110 60



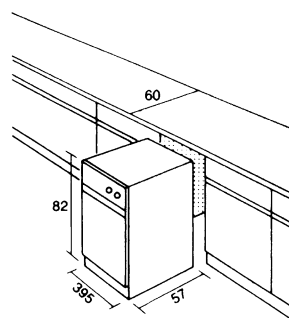
⑥ Corner units



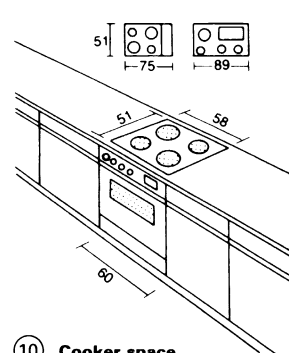
⑦ Built-in cooker



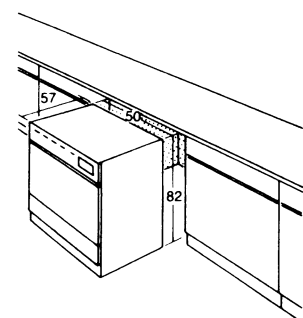
⑧ Kitchen centre



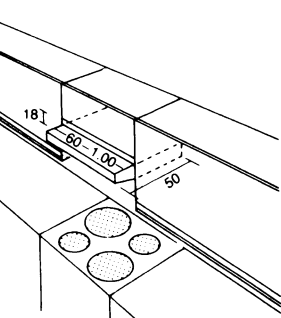
⑨ Electrical waste compaction unit



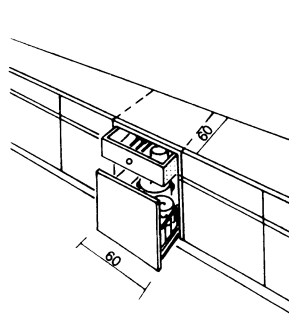
⑩ Cooker space



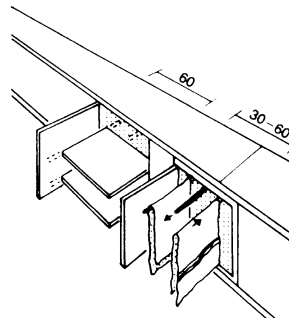
⑪ Dishwasher



⑫ Extractor hood



⑬ Saucepan cupboard with drawers

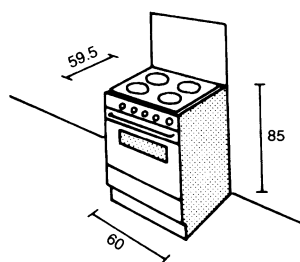


⑭ Equipment cupboard and towel cupboard

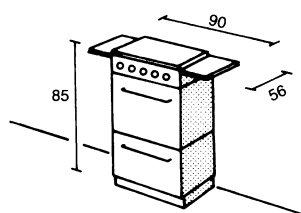
KITCHENS

The dimensions of built-in units and equipment must be taken into consideration when designing the layout and storage areas of a space-efficient kitchen. Modern electrical and gas units as well as kitchen furniture are made such that they can usually be fitted together and built in, giving combinations that ensure a smooth flow of work. Provide sufficient shock-proof sockets: a minimum of one double socket for each working and preparation area.

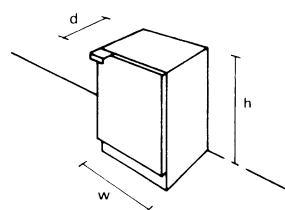
A double sink unit is usually required → ⑦ - ⑨, ideally with a draining surface on one side and a standing surface on the other. Dishwashers should be fitted to the right or left of the sink. Where the kitchen is very small, compact kitchens → ⑩ offer a solution. They require little space and can be fitted with many useful features.



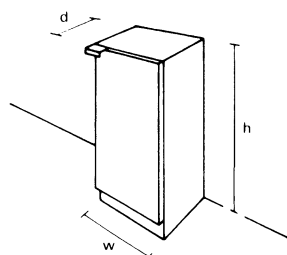
① Electric cooker



② Large gas cooker



③ Refrigerator



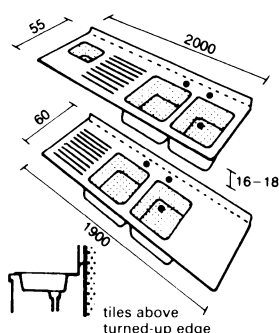
④ Upright freezer

size (l)	w (cm)	d (cm)	h (cm)
50	55	55-60	80-85
75	55	60-65	85
100	55-60	60-65	85
125	55-60	65-70	90-100
150	60-65	65-70	120-130
200	65-70	70-75	130-140
250	70-80	70-75	140-150

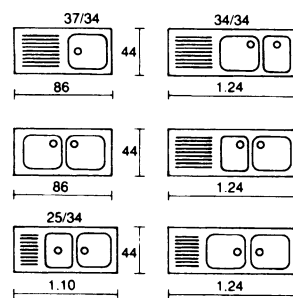
⑤ Dimensions: refrigerators and freezers → ③ + ④

size (l)	w (cm)	d (cm)	h (cm)
50	55	55-60	80-85
75	55	60-65	85-90
100	55	60-65	90

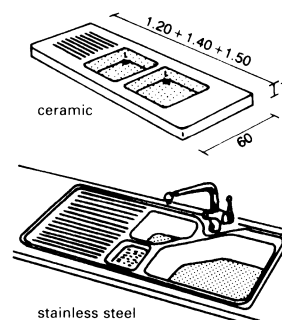
⑥ Dimensions: built-in refrigerators



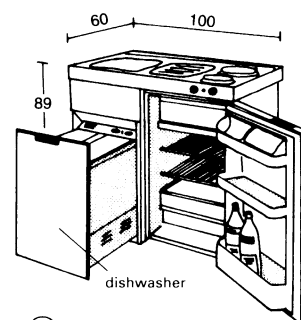
⑦ Dimensions: built-in sinks



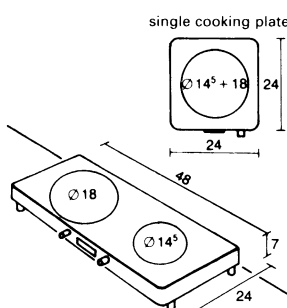
⑧ Types of built-in sinks



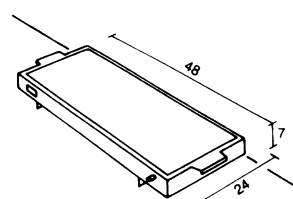
⑨ Sink units



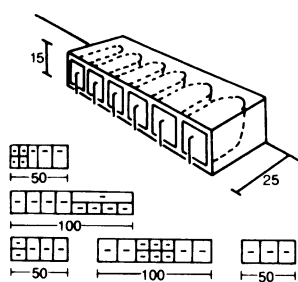
⑩ Compact kitchen



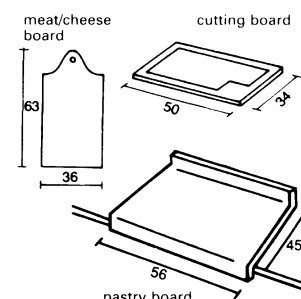
⑪ Cooking plates



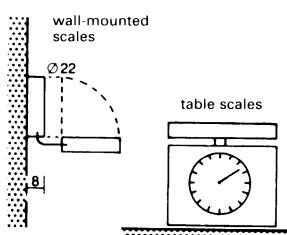
⑫ Hotplate



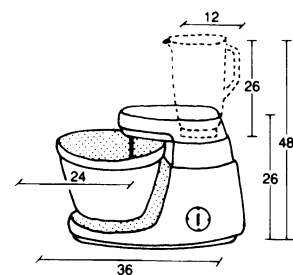
⑬ Glass or plastic storage canisters



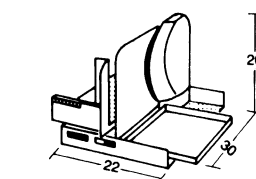
⑭ Kitchen boards



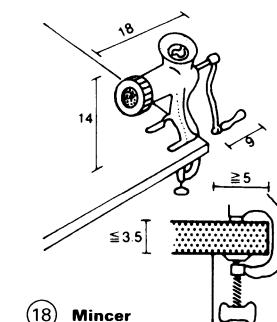
⑮ Kitchen scales



⑯ Food processor

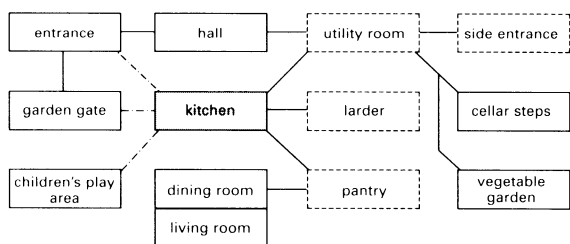


⑰ Multipurpose slicer



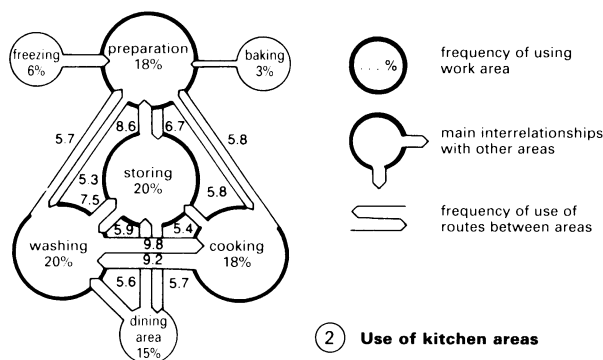
⑱ Mincer

KITCHENS

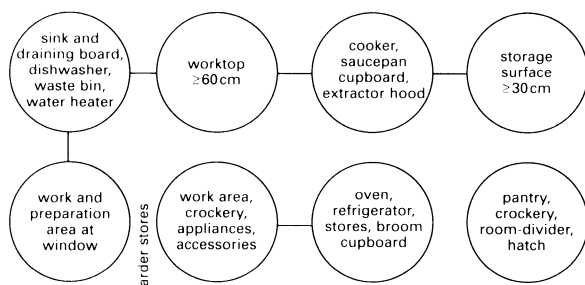


--- view from kitchen
 — routes
 rooms normal only in larger houses

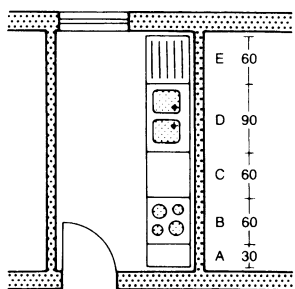
1 Relationship between large kitchen and other areas



2 Use of kitchen areas

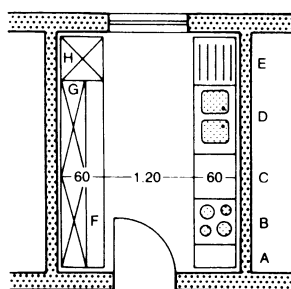


3 Effective kitchen workplace arrangement



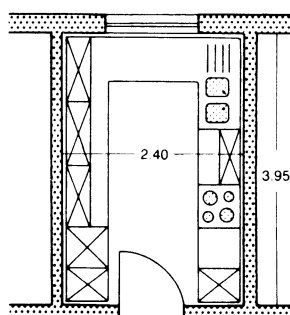
A = storage surface 30 D = sink (according to make)
 B = cooker 60 E = standing/drainage surface
 C = storage surface 60

4 One-sided kitchen

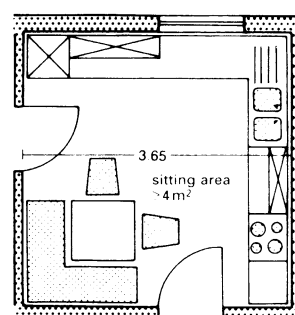


F = large worktop and cupboard units
 G = wall units
 H = full-height cupboard

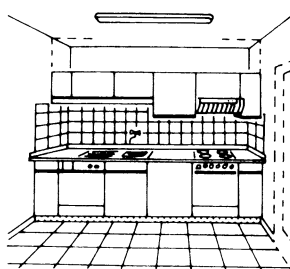
5 Two-sided kitchen



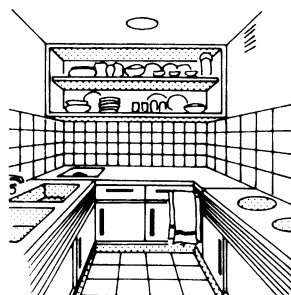
6 U-shaped kitchen



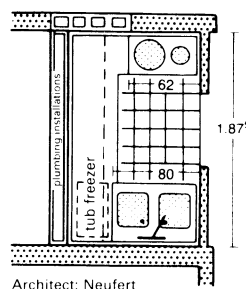
7 L-shaped kitchen with dining area (Haas & Sohn)



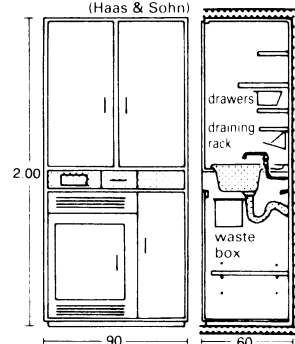
8 Perspective view of one-sided kitchen → 4



9 General view → 1



10 Mini-kitchen with internal ventilation Architect: Neufert



11 Kitchen wall unit

Kitchens should face north-east or north-west and be adjacent to any vegetable/herb garden and cellar. Ideally the kitchen should look out on the garden gate, house door, children's play area and the patio → ①. They should be well located internally with respect to the pantry, dining room and utility room.

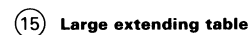
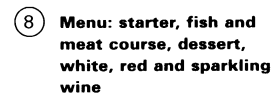
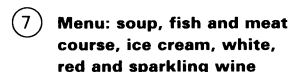
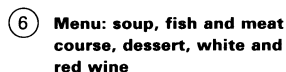
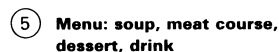
Although the kitchen is primarily a workplace within the house, it is a room in which the householder may spend long periods so careful design is important. The kitchen is also often a meeting point for the family if it contains a dining or snack area → ⑦.

When fitting out the kitchen arrange the units in a way that follows the sequence of tasks to reduce the amount of walking required, and ensure there is sufficient room for free movement. Where possible, seek to reduce the amount of work done standing and ensure no activity requires an unfavourable body posture by matching working heights to body sizes. Good lighting of the work surfaces is another essential provision (→ p. 251).

An appropriate arrangement to ease work in the kitchen would be, from right to left: storage surface, cooker, preparation area, sink, draining surface → ③ - ④. (Note that left-handed people often prefer to work from left to right.) A width of 1.20m between the sides is essential for free movement and using appliances and fittings. With a depth of 60cm on each side this gives a minimum kitchen width of 2.40m → ⑤.

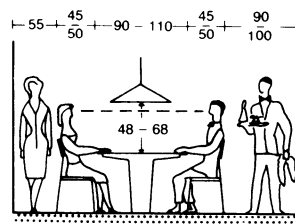
The minimum area for a cooking recess is 5-6m²; for normal kitchens it is 8-10m², and 12-14m² for normal kitchens with dining or snack areas → ④ - ⑦.

For planning purposes, the following width requirements for fittings and equipment may be used: cooker 60cm, twin sinks and draining surface (including dishwasher) 150cm, refrigerator 60cm, freezer 60cm, cupboards (provisions, cleaning materials, crockery and appliances) 170cm. With a worktop surface width of 200cm, this gives a total requirement of 700cm of standing area.

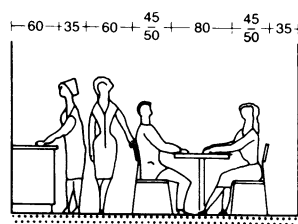

$$\varnothing \text{ round table} = \frac{(\text{seat width (m)} \times \text{number of people})}{3.142}$$

e.g. for 0.60m seat width and six people = $\frac{(0.60 \times 6)}{3.142} = 1.15\text{m}^2$

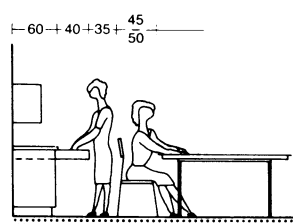
⑪ Minimum area requirements → ⑪ + ⑫



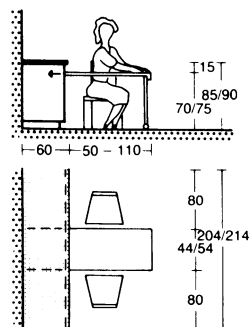
1 Minimum table-to-wall distance depends on how food will be served



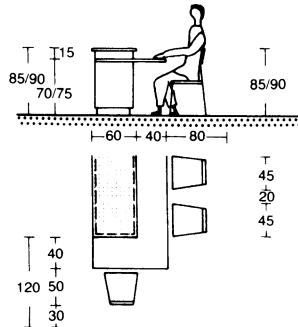
2 Allow space between sideboard and table for walkway



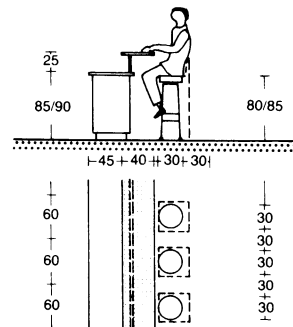
3 Allow for drawers and doors



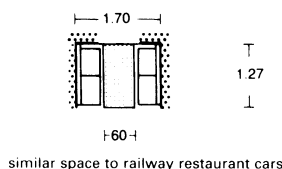
4 Retractable table



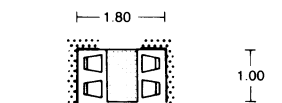
5 Fitted table



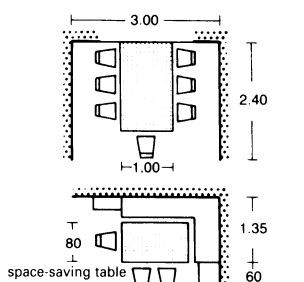
6 Breakfast bar



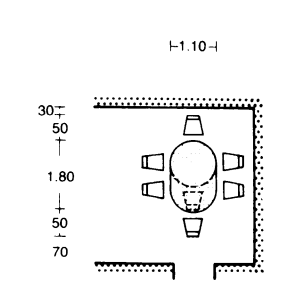
similar space to railway restaurant cars



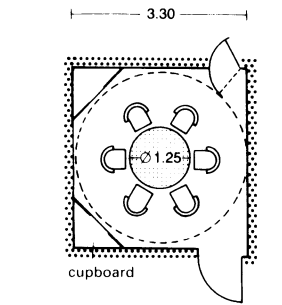
7 Smallest space for dining table and recess



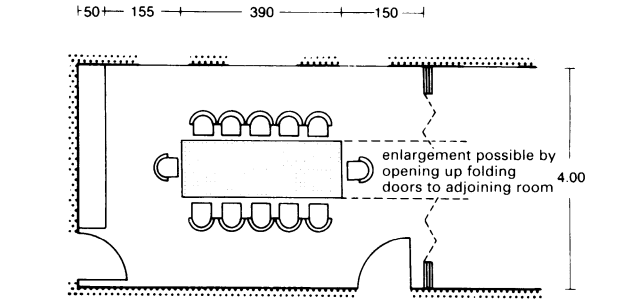
8 Ensure clear access to rear seats with more than five diners



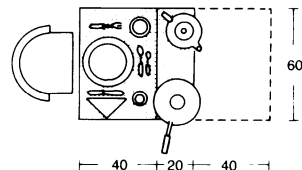
9 Round table, four to six people



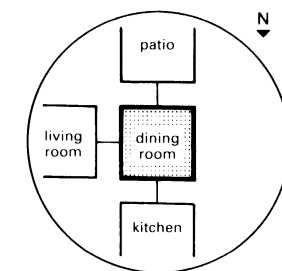
10 Minimum size for six diners with round table



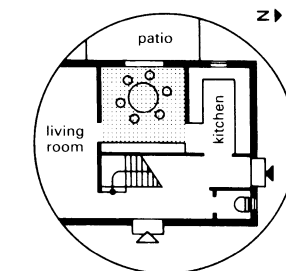
11 Most comfortable seating arrangement in dining room for 12 people (with sideboard)



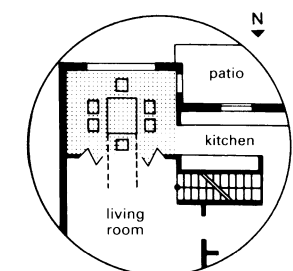
12 Typical table cover



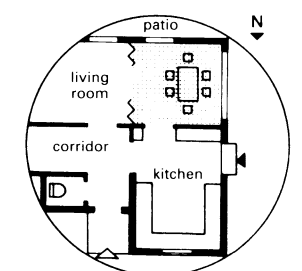
13 Dining room layout scheme



14 Self-contained dining room between kitchen and living room (undisturbed dining area)



15 Dining room between patio and living room: folding doors allow combination with the living room



16 Dining room and living room, as 15, on common patio giving good natural lighting

DINING AREAS

It is often desirable to have space in the kitchen for eating snacks, breakfast etc. and use the dining room for main meals only. This can be provided by including a retractable table, with a height of 70–75cm, which is pulled out of a base unit → ④. A movement area of at least 80cm is needed to the left and right of the table. If sufficient space is available a fixed table against a free-standing unit can be used → ⑤. Another alternative is the breakfast bar arrangement → ⑥. This requires less depth than the fixed table, even though the surface is also 40cm deep, because of its elevation but this also means that special stools are required. Depending on their design, full dining areas require far more space but they can obviate the need for an additional dining room → ⑦ + ⑧. A corner seat and dining table take up the least amount of space → ⑧.

It is useful to be able to extend the dining room through wide doors or a folding wall for special occasions → ⑪ + ⑮. To eat comfortably an individual needs a table area of 60 × 40cm. A strip of 20cm is needed in the centre of the table for dishes, pots and bowls → ①. Lighting should not be dazzling: the ideal distance from lower edge of the light to the table top is around 60 cm → ①.

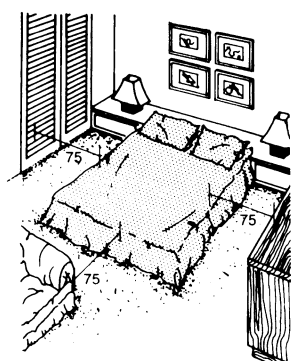
Suitable locations for dining rooms are shown in ⑭ – ⑮.

BEDROOMS

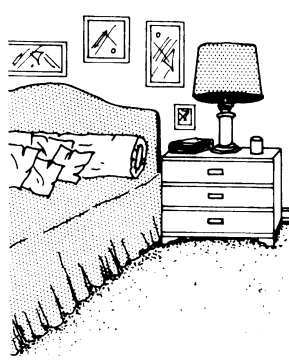
To ensure comfort while sleeping, the bed length should be 250 mm longer than the individual's height. Based on average heights, beds are produced in a range of standard sizes: 900 × 1900 mm, 1000 × 1900 mm, 1000 × 2000 mm, 1600 × 2000 mm and 2000 × 2000 mm. The bedroom layout should give at least 600 mm, preferably 750 mm, around the bed → ①. This is important to allow the bed to be made easily and also, if there is a cupboard standing parallel to the bed, to give enough space for movement even if the cupboard doors are open.

There should always be a bedside cabinet to the left and right of double beds and a headboard, onto which one can fix clip lights for reading, is also useful → ②. Bedside lamps should be provided in addition to general lighting.

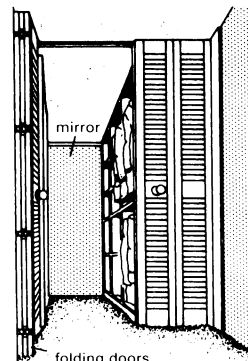
About 1 m of cupboard length should be planned per person. If there is not enough room in the bedroom, then space can be found in the corridor → ⑩. At least one mirror, in which one can see oneself from head to toe, should be fitted in a bedroom: mirrored cupboard fronts are even better.



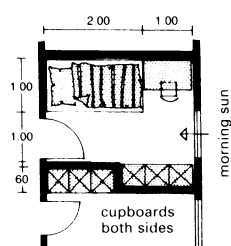
① Allow 750 mm around beds



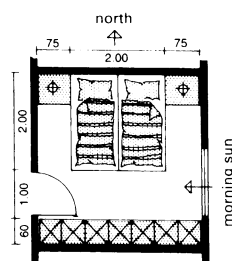
② Storage: bedside table



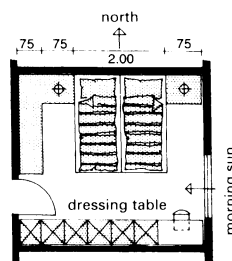
③ Walk-in cupboard with folding doors



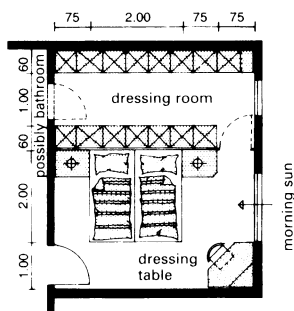
④ Small bedroom for a child



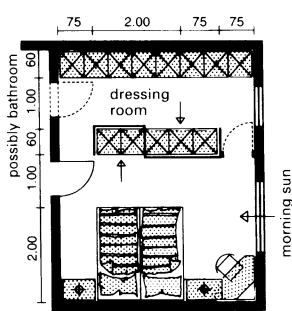
⑤ Standard bedroom layout



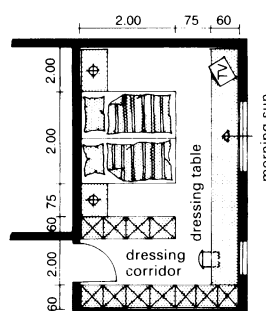
⑥ Bedroom with space for dressing table and side cupboard



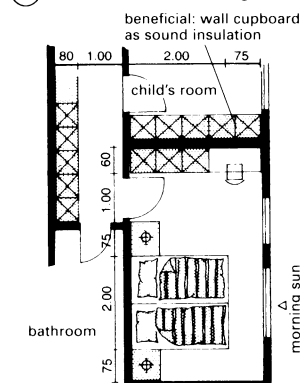
⑦ Bedroom with dressing room



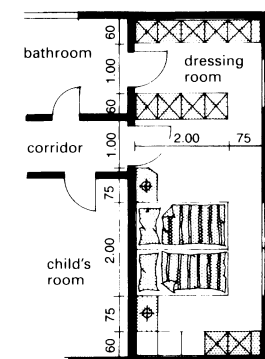
⑧ Bedroom with dressing room



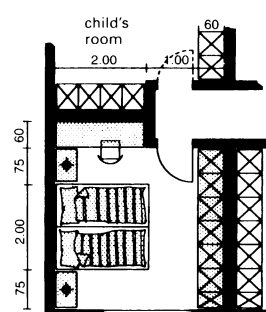
⑨ Large bedroom with dressing corridor



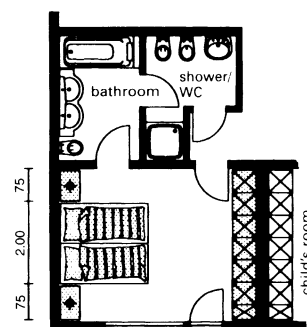
⑩ Bedroom with adjacent cupboard corridor



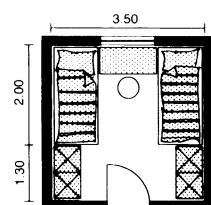
⑪ Bedroom with dressing room and access to bathroom



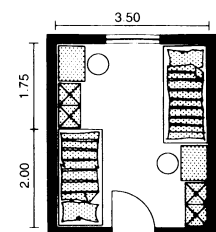
⑫ Bedroom with adjacent child's room



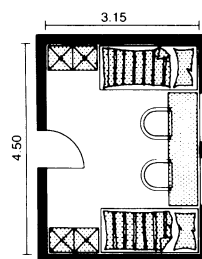
⑬ Bedroom with shower/bathroom



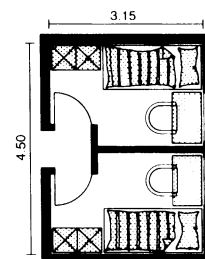
⑭ Two-bed room for children/guests



⑮ → ⑭



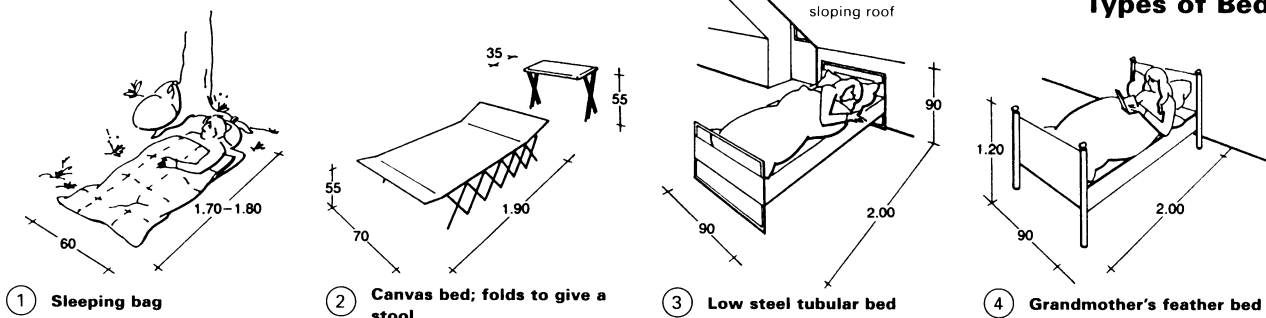
⑯ Two-bed room



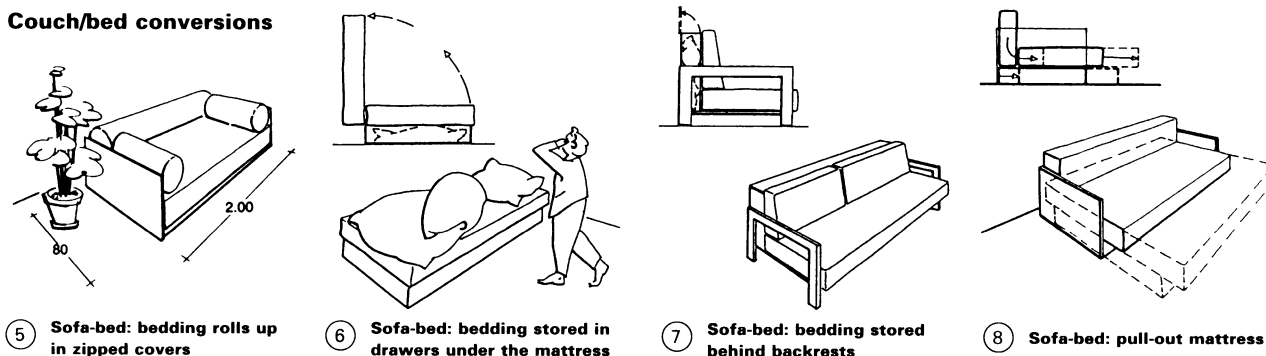
⑰ Dividable → ⑯

BEDROOMS

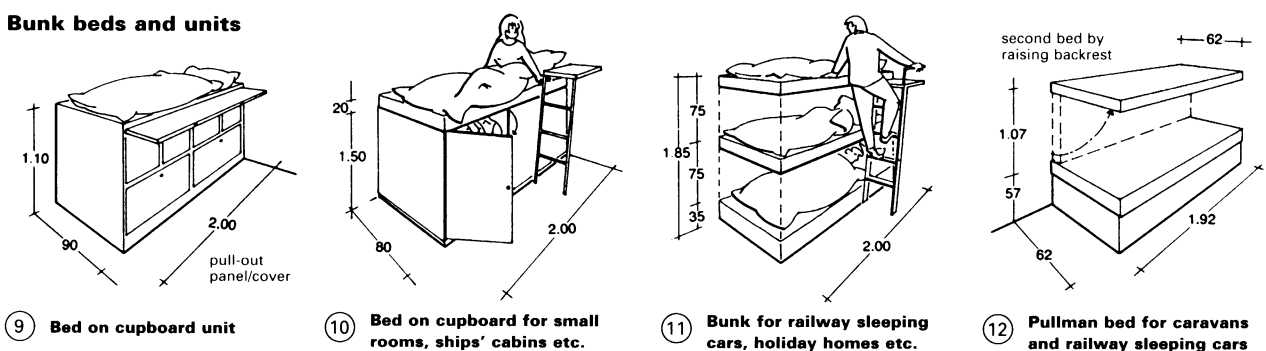
Types of Bed



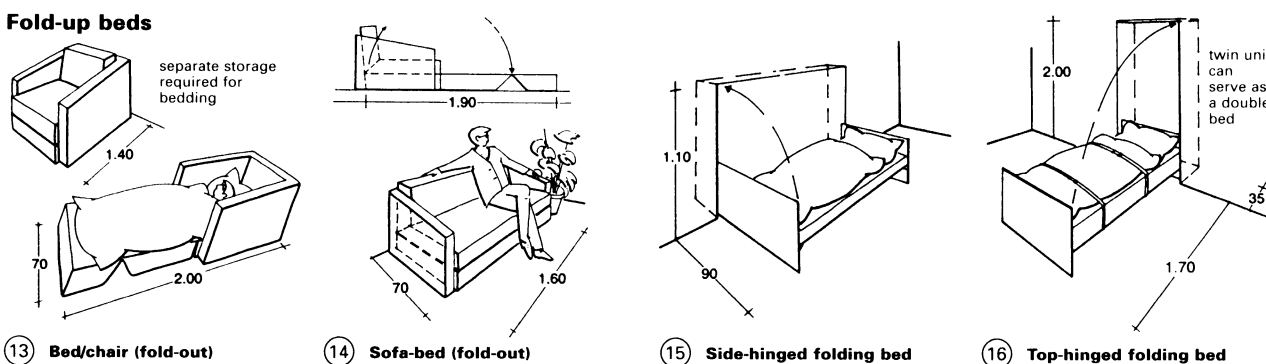
Couch/bed conversions



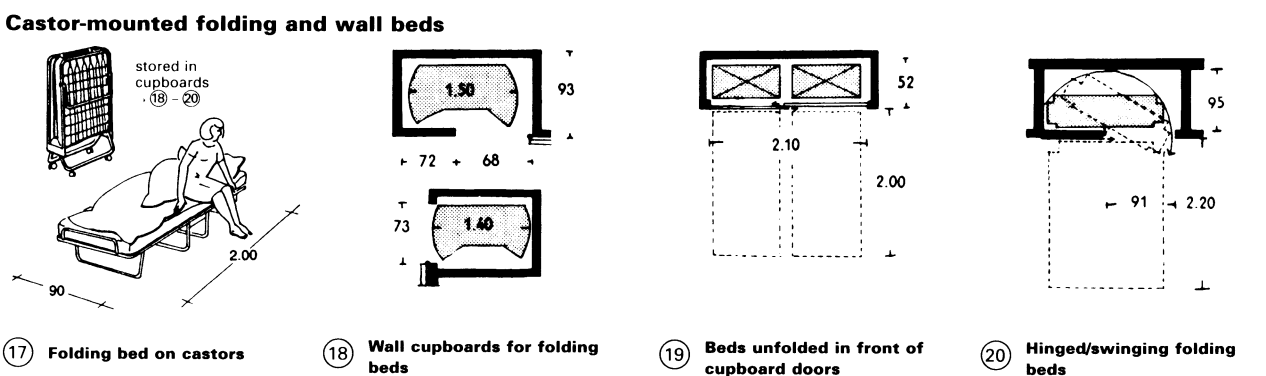
Bunk beds and units



Fold-up beds



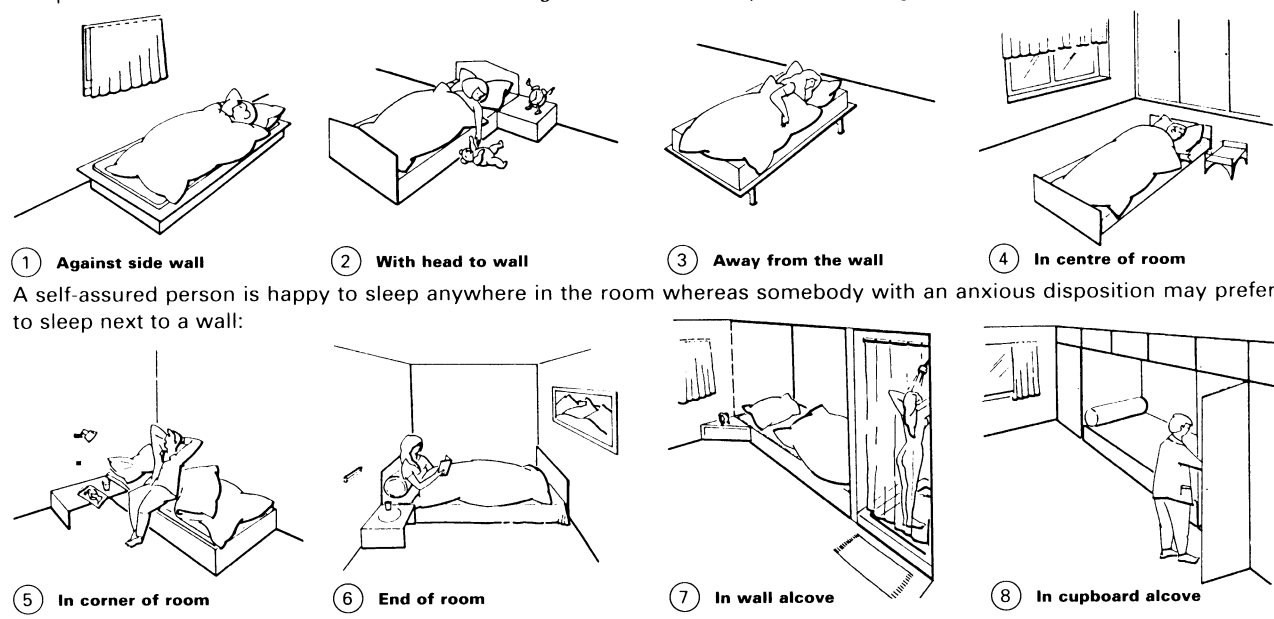
Castor-mounted folding and wall beds



BEDROOMS

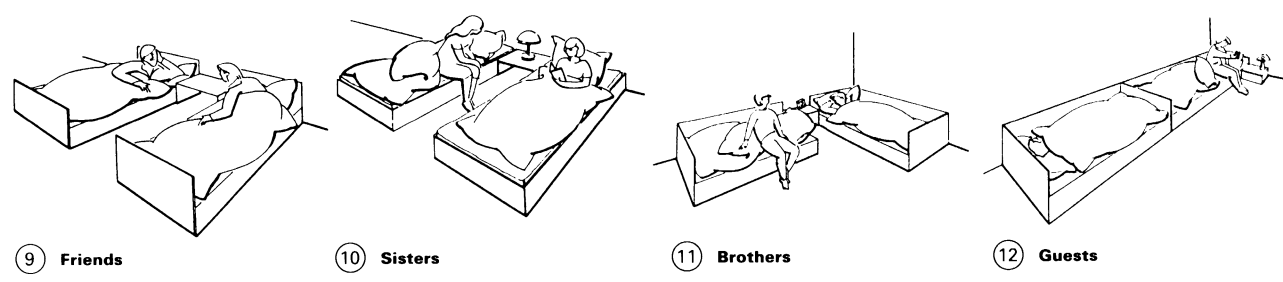
Bed Positions

The position of the bed within a room can have a significant effect on a person's feelings of well-being:

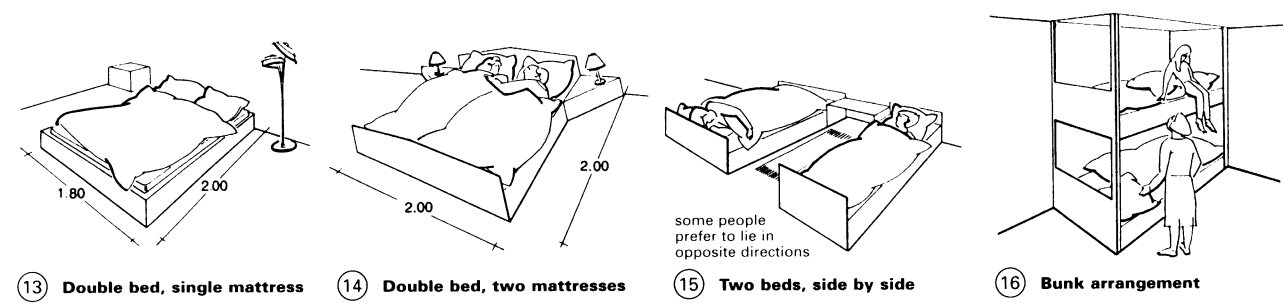


A self-assured person is happy to sleep anywhere in the room whereas somebody with an anxious disposition may prefer to sleep next to a wall:

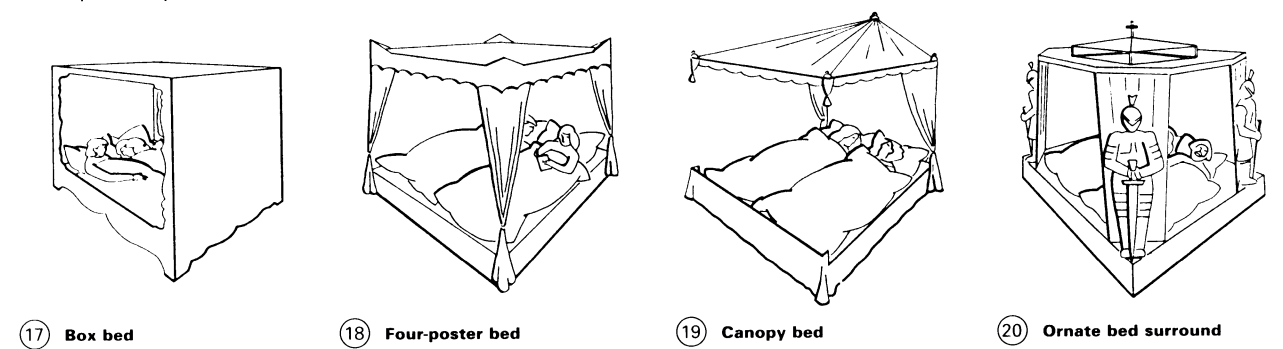
In addition to room decoration and furnishings, a restful atmosphere also depends on the orientation of the bed (head best towards north), position with respect to the light (looking away from window) and the door (looking towards door). Where there is more than one bed their position with respect to each other is important:



Different arrangements of beds may be desirable if friends, sisters, brothers or guests sleep in one room:



The arrangement of double beds (and single beds placed side by side or as bunks) has more to do with personal preference than space. Separate beds have now become common for couples whereas an enclosed double bed was customary in the past:



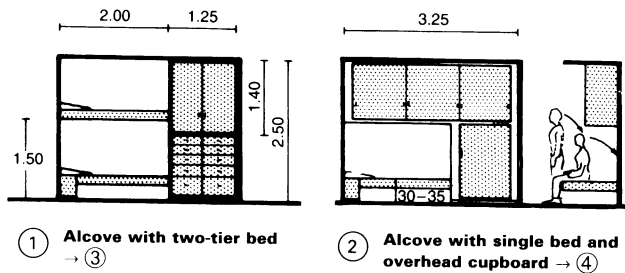
The last example is formed like a basilica and lit by a special ceiling light when the curtains are closed. These last four examples show how the room and furniture decoration has depended strongly on the customs of the era.

BEDROOMS

Bed Alcoves and Wardrobes

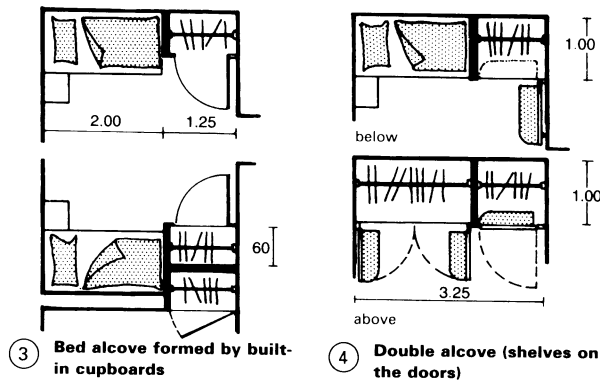
Built-in cupboards and fitted wardrobes are ideal for owner-occupied houses, whereas free-standing units are better for rented housing. With small rooms it is necessary to make use of every space and this need can be satisfied effectively by creative use of built-in cupboards. Highly suitable are complete fitted wardrobes or cupboard rooms in walls between the bedrooms.

Care must be taken to avoid condensation in cupboards on exterior walls. This is achieved by providing insulation and good ventilation. Ventilation is also necessary for cupboard rooms → 14.



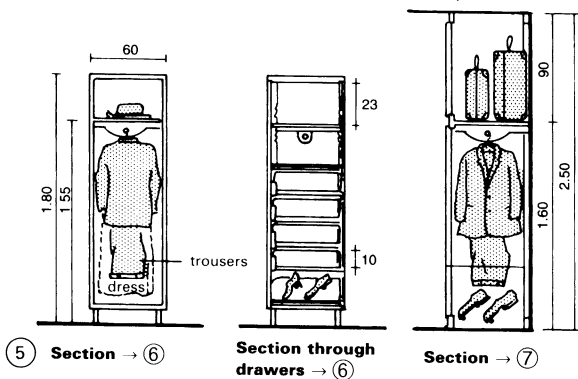
1 Alcove with two-tier bed → 3

2 Alcove with single bed and overhead cupboard → 4



3 Bed alcove formed by built-in cupboards

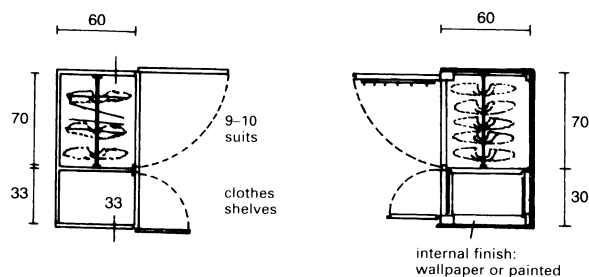
4 Double alcove (shelves on the doors)



5 Section → 6

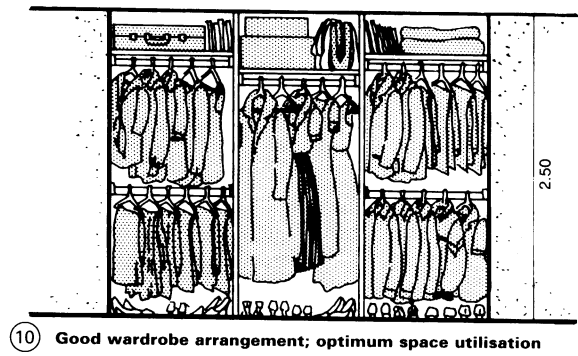
6 Section through drawers → 6

7 Section → 7

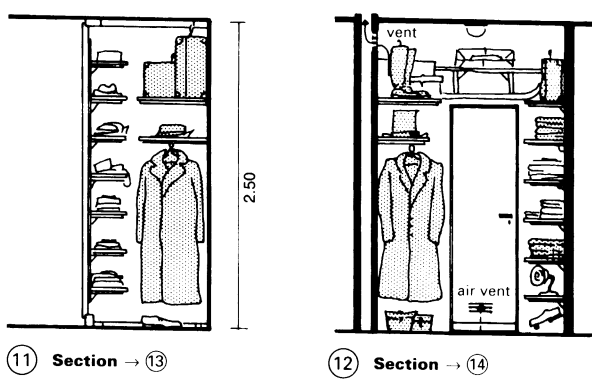


8 Normal wardrobe

9 Built-in wardrobe

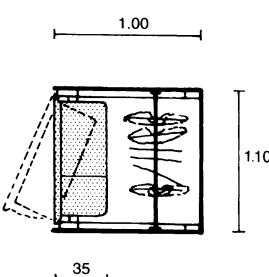


10 Good wardrobe arrangement; optimum space utilisation

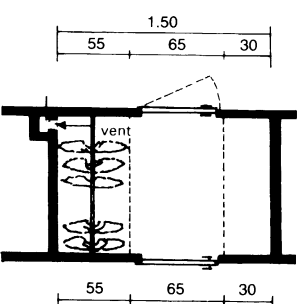


11 Section → 13

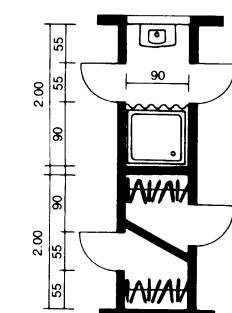
12 Section → 14



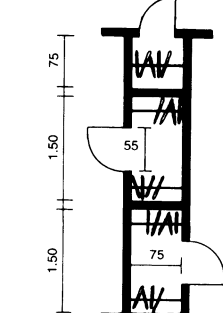
13 Built-in double wardrobe; economical and compact



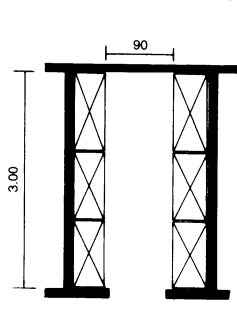
14 Cupboard room between two bedrooms



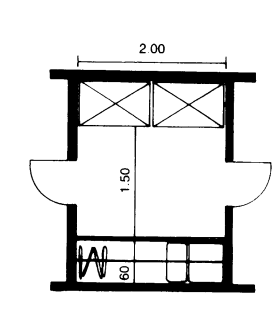
8 Cupboard space and shower between two children's bedrooms



9 Cupboard area with separate accesses



15 Cupboard room with cupboards on both sides



16 Cupboard room with space for dressing

BEDROOMS

Storage requirements

When planning storage areas in bedrooms the following numbers may be used to work out an approximate minimum volume.

For men

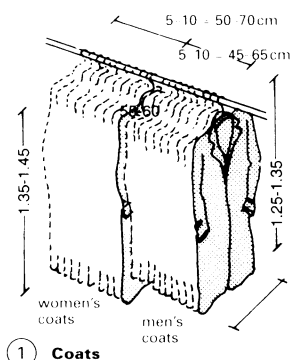
- 8 suits
- 6 coats
- 8 jackets
- 12 pairs trousers
- 20 shirts
- 15 tee-shirts
- 12 jumpers
- 4 pairs pyjamas
- 8 pairs shoes
- 2 hats

For women

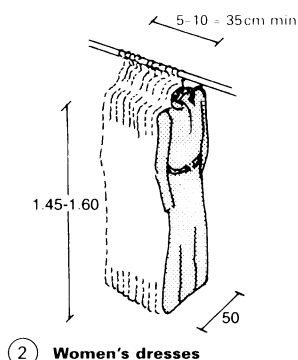
- 6 suits
- 10 coats
- 5 jackets
- 20 dresses
- 15 skirts
- 15 blouses
- 20 tops
- 15 jumpers
- 15 pairs leggings/trousers
- 6 pyjamas/nightdresses
- 10 pairs shoes
- 4 hats

Sundry items

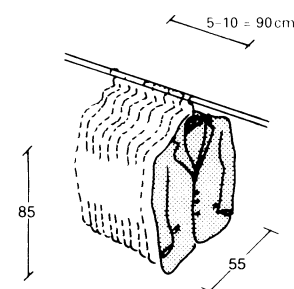
- 6 sheets
- 6 duvet covers
- 12 pillows and cases
- 8 bath towels
- 8 hand towels



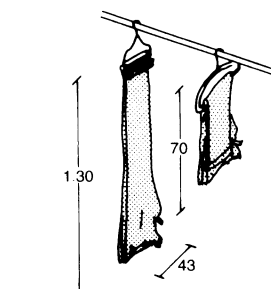
1 Coats



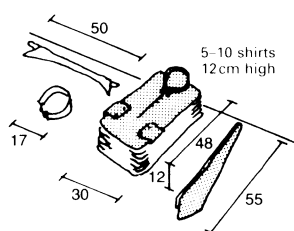
2 Women's dresses



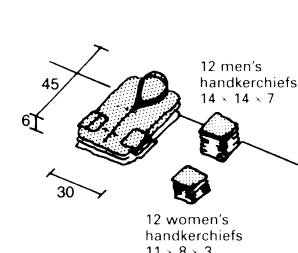
3 Jackets



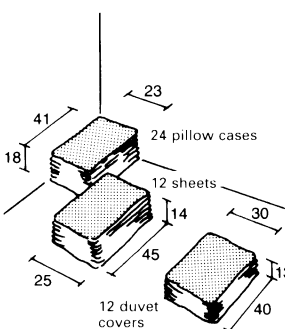
4 Trousers



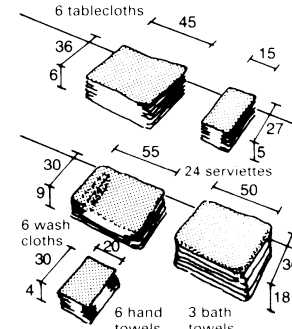
5 Men's clothes



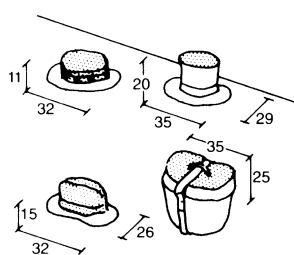
6 Pyjamas and handkerchiefs



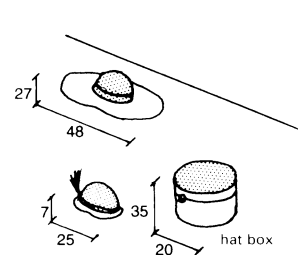
7 Bed linen



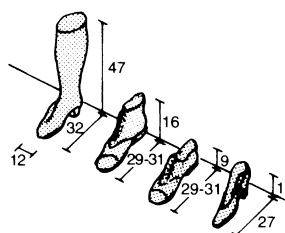
8 Towels



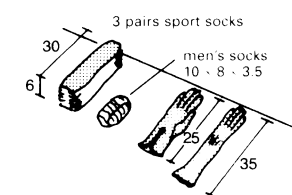
9 Men's hats



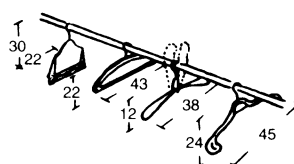
10 Women's hats



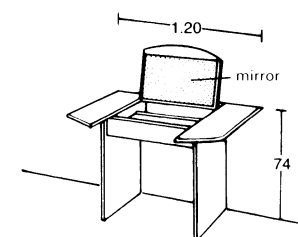
11 Boots and shoes



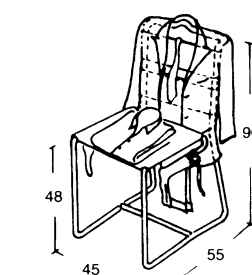
12 Socks and gloves



13 Clothes hangers



14 Dressing table



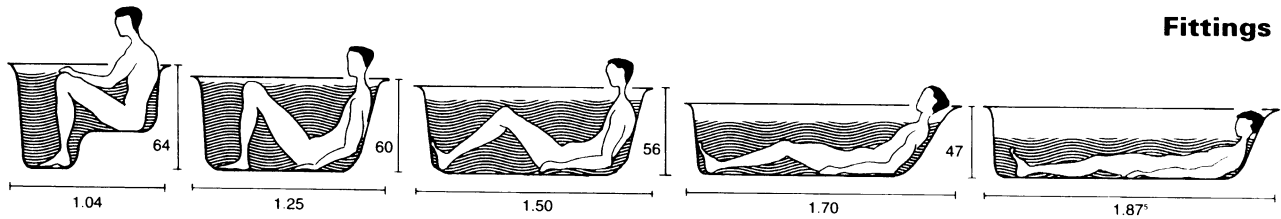
15 Clothes chair (back in the form of a hanger)



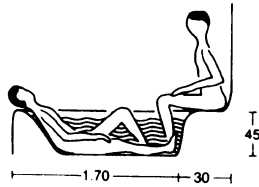
16 Built-in clothes cupboard using the doors for storage

BATHROOMS

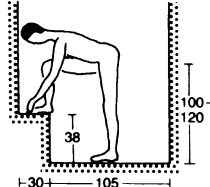
Fittings



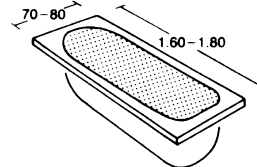
① Deeper water required for shorter baths



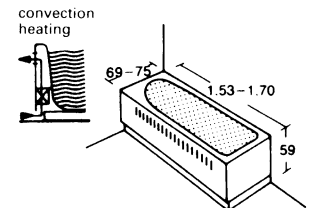
② Bathing and sitting



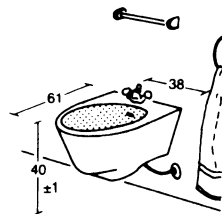
③ In the shower



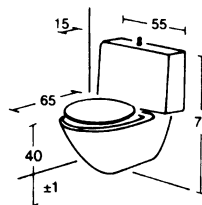
④ Bath unit



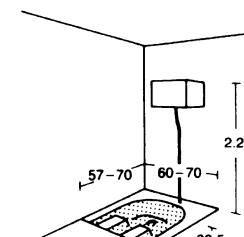
⑤ Bath panelled on one or two sides with convection heating



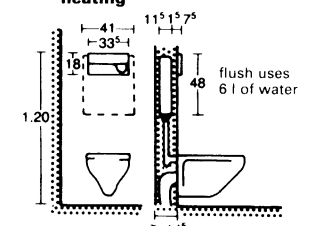
⑥ Wall-mounted bidet



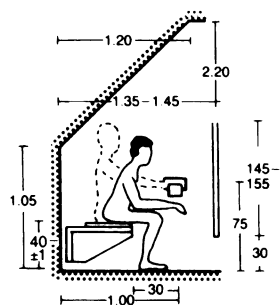
⑦ Wall-mounted deep-flush toilet bowl and cistern



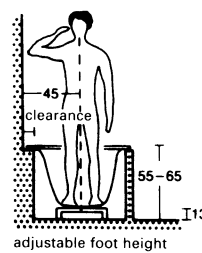
⑧ Squatting WC (French style)



⑨ Deep-flush toilet bowl; built-in cistern



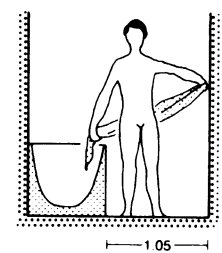
⑩ WC under sloping roof or stairs



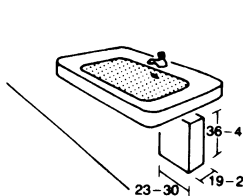
⑪ Necessary minimum wall clearance for washing



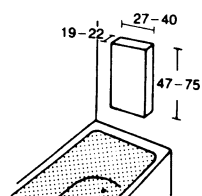
⑫ Minimum space between bath and wall



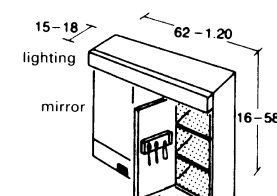
⑬ Recommended clearance



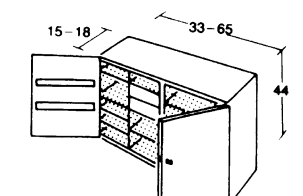
⑭ Hot water storage tank beneath wash-basin



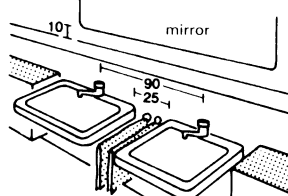
⑮ Gas heater: requires a flue



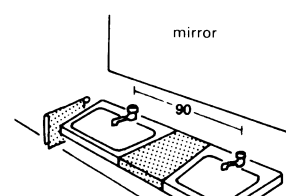
⑯ Bathroom cupboard



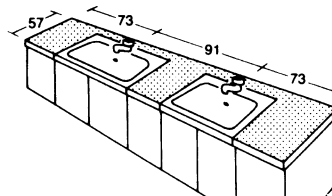
⑰ Lockable medicine cupboard



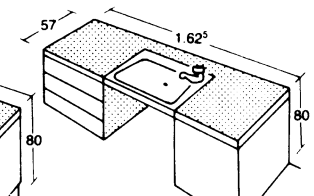
⑱ Two wash-basins, towel rails between



⑲ Double wash-basin



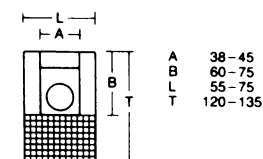
⑳ Double vanity unit, cupboards below



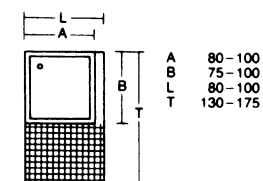
㉑ Single vanity unit

BATHROOMS

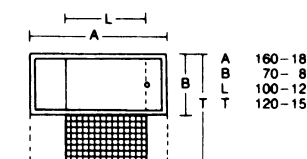
1. Wall-mounted units are preferable for hygiene reasons and for ease of cleaning. Deep-flush WCs reduce odours.



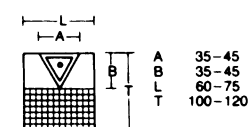
2. In contrast to showers, baths may be used medicinally (e.g. muscle relaxation) as well as for washing.



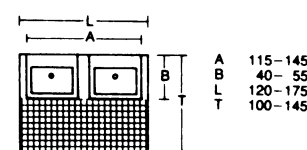
3. Bath tubs are usually installed as built-in units and may have convection heating inside.



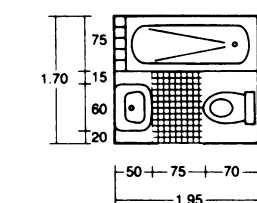
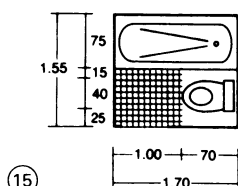
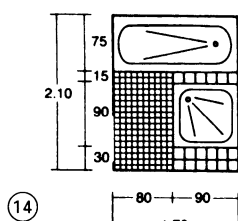
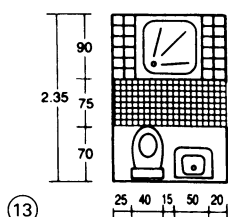
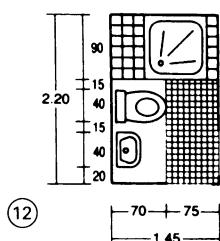
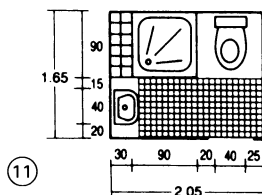
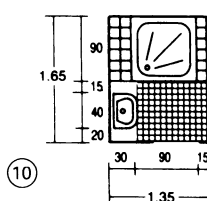
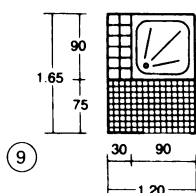
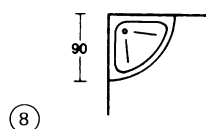
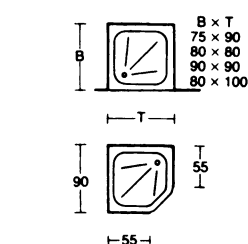
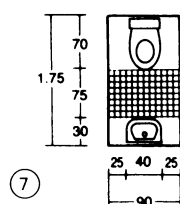
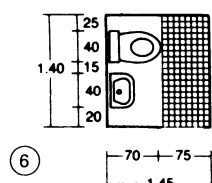
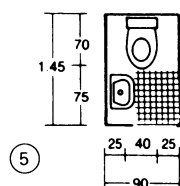
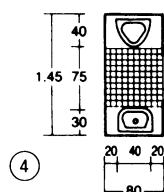
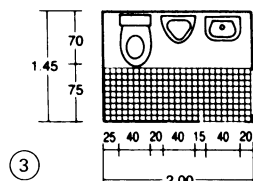
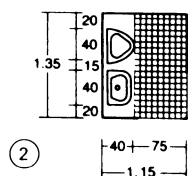
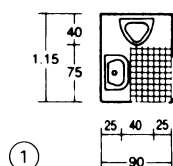
4. Urinals → ① - ④ are often found in today's households.



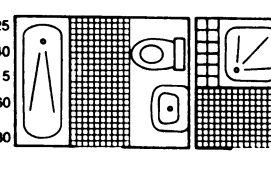
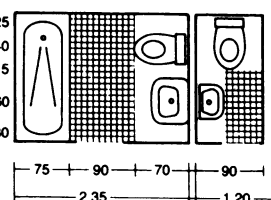
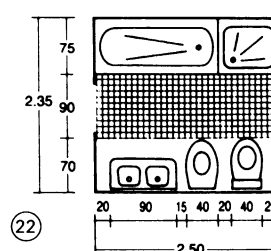
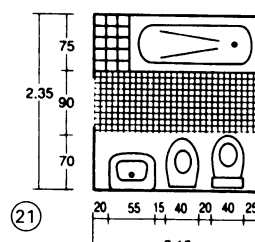
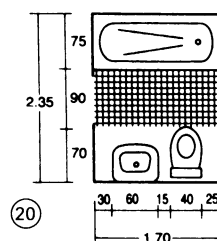
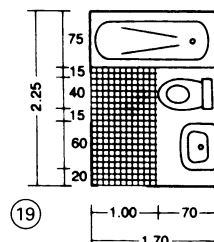
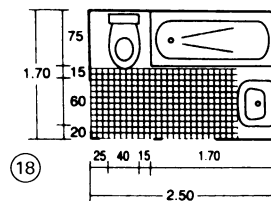
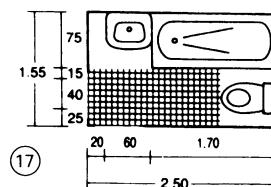
5. Wash-basins:



Should be of a suitable size and have ample surrounding flat storage surfaces. Flush-mounted fittings save space and are easy to clean. Mixer taps save water and energy. Note that 1.20m wide double wash-basins do not really provide enough free arm movement when washing: better is a layout with two basins, towel rails in between and storage to the sides → p. 262 ⑮.



16



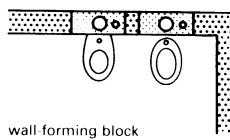
24

BATHROOM

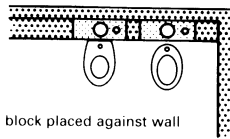
Cubicles

Traditional wet room installations usually involve substantial expenditure and a lot of time. Because the requirements are largely standardised, prefabrication is desirable, especially for terraced and multi-family housing projects, holiday homes, apartments, hotel facilities and for old building restoration work. Sanitary blocks can be prefabricated → ① – ③, as well as utility walls or complete cubicles → ④ – ⑬, with premounted piping as well as units with accessories. Prefabricated compact cubicles are supplied in a range of fixed dimensions.

Prefabricated cubicles are mostly sandwich construction, with wooden frame and chipboard or fibre-cement panels. They use aluminium, moulded stainless steel or glass-fibre reinforced plastic to match the units and accessories.

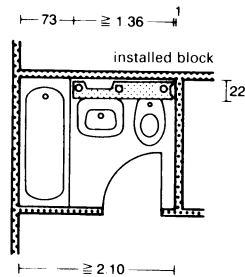


wall-forming block

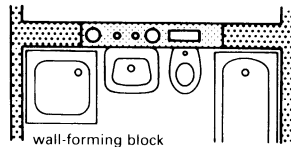


block placed against wall

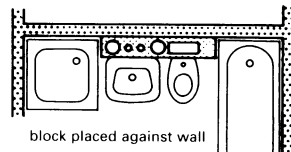
① WC sanitary elements



③ Sanitary block in front of wall

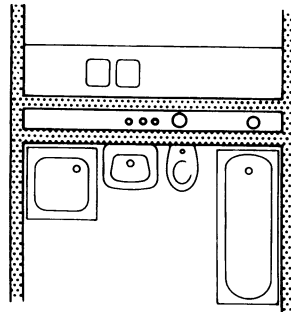


wall-forming block

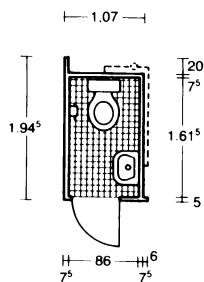


block placed against wall

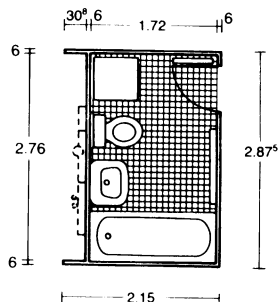
② Bathroom sanitary elements



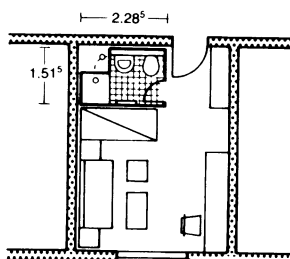
④ Utility wall



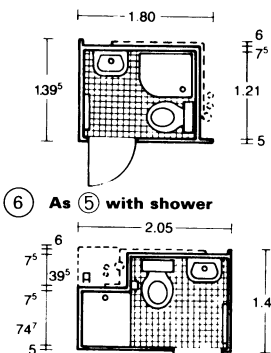
⑤ Compact WC cubicle with units



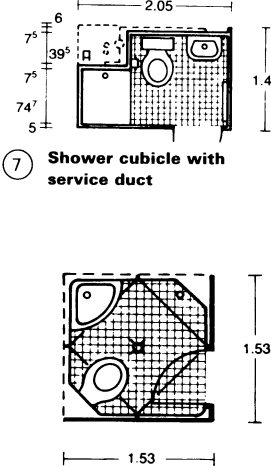
⑩ Bathroom cubicle with washing machine



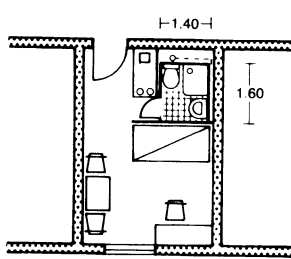
⑭ Hotel-style shower cubicle



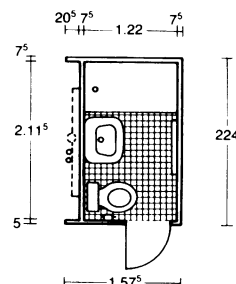
⑥ As ⑤ with shower



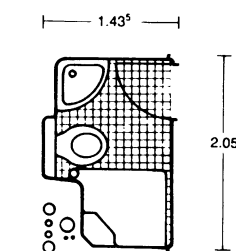
⑪ Compact WC cubicle



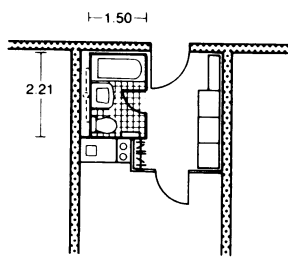
⑮ Shower cubicle in the smallest flat



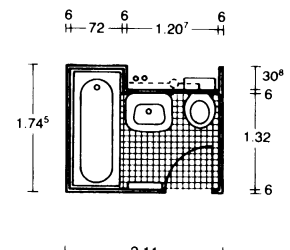
⑧ Larger WC cubicle with shower



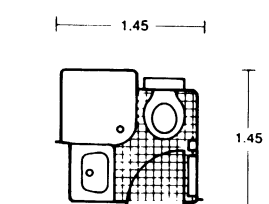
⑫ As → ⑪ but with shower to one side



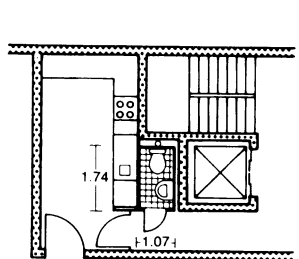
⑯ Prefabricated bathroom with kitchen utility wall



⑨ Bathroom cubicle



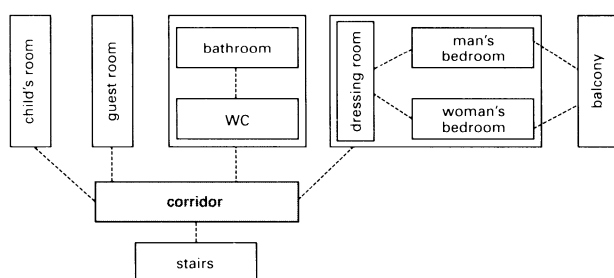
⑬ Compact cubicle with shower



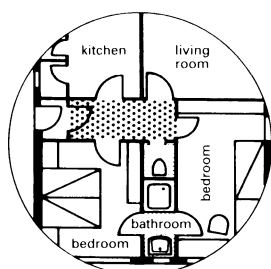
⑬ Hospital-style WC cubicle

BATHROOMS

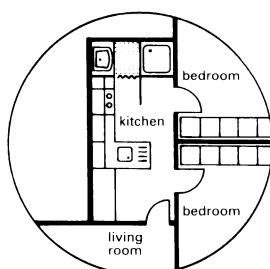
Location



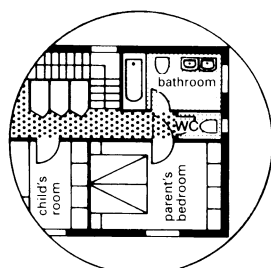
1 Spatial relationships with the bathroom



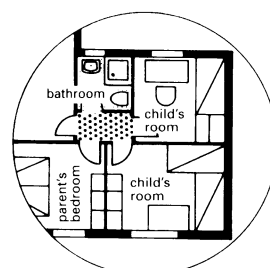
2 Bathroom between bedrooms, WC accessible from corridor



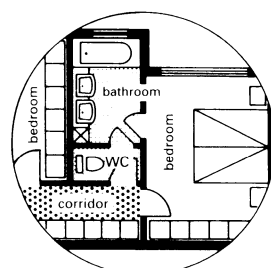
3 Bathroom built into kitchen



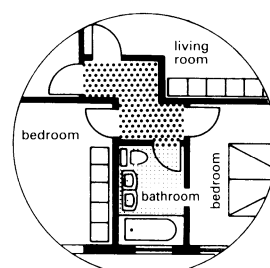
4 Swing doors to bathroom and WC from parents' bedroom



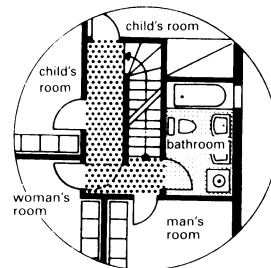
5 Bathroom on landing between bedrooms



6 Bathroom accessible from corridor and bedroom



7 Bathroom between bedrooms



8 Bedrooms and bathroom can be closed off using swing doors



9 Bathroom and separate shower

The most convenient location for the bathroom is adjacent to the bedrooms (and the WC if it is not incorporated in the bathroom itself). Although showers are compact and often preferred by younger people, baths are generally more suitable for the elderly.

If the house has no utility room and a small kitchen, spaces and connections can be provided in the bathroom for washing machines and laundry baskets.

bathroom unit/equipment	floor area	
	width (cm)	depth (cm)
built-in wash-basins and bidets		
1 single built-in wash-basin	> 60	> 55
2 double built-in wash-basin	> 120	> 55
3 built-in single wash-basin with cupboard below	> 70	> 60
4 built-in double wash-basin with cupboard below	> 140	> 60
5 hand wash-basin	> 50	> 40
6 bidet (floor-standing or wall-mounted)	40	60
tubs/trays		
7 bathtub	> 170	> 75
8 shower tray	> 80	> 80*
WC and urinals		
9 WC with wall unit or pressure cistern	40	75
10 WC with built-in wall cistern	40	60
11 urinal	40	40
washing equipment		
12 washing machine	40 to 60	60
13 clothes drier	60	60
bathroom furniture		
14 low cupboards, high cupboards, wall-hung cupboards	according to make	40

* in the case of shower trays with w = 90 this can also be 75cm

10 Space requirements for bathroom and WC units

water consumption for:	water consumption (l)	water temperature (°C)	approximate time (mins)
washing:			
hands	5	37	2
face	5	37	2
teeth	0.5		3
feet/legs	25	37	4
whole body	40	38	15
hair washing	20	38	10
children's bath	30	40	5
bathing:			
full bath	140-160	40	15
sitz bath	40	40	8
shower bath	40-75	40	6
grooming:			
wet shave	1	37	4

11 Hot water requirements: temperature and usage time for domestic water heaters

BATHROOMS

Location

Bathrooms with WCs are self-contained rooms which are equipped with all of the fittings necessary to meet all the sanitary needs of the occupants. However, the plan should ideally include two separate lockable rooms for the bathroom and WC and this is essential in dwellings for more than five people. A bathroom with WC can be directly accessible from the bedroom as long as another WC can be reached from the corridor → ② + ⑩.

A bathtub and/or shower tray plus a wash-basin are installed in the bathroom, while a flushing toilet, bidet and hand washing basin are installed in the WC.

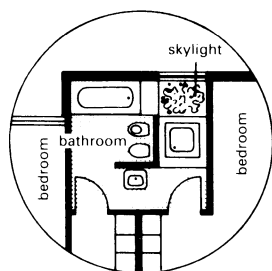
For cost efficiency and technical reasons the bathroom, WC and kitchen should be planned such that they can share the same service ducts → ③ + ④, ⑦ – ⑩. In multistorey homes, an arrangement such that the utility walls for the bathrooms and WCs are directly above one another helps to keep installation costs and the necessary sound insulation measures as low as possible. However, adjacent bathrooms in two different flats must not be connected to a single supply or discharge pipe system.

The bathroom and WC should be orientated towards the north, and should normally be naturally lit and ventilated. At least four air changes per hour are required for internal rooms. For comfort, a bathroom temperature of 22 to 24°C is about right. A temperature of 20°C is suitable for WCs in homes. This is higher than that encountered in office buildings, where 15 to 17°C is the common norm.

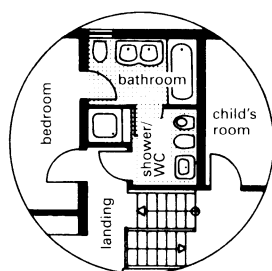
Bathrooms are particularly susceptible to damp so appropriate sealing must be provided. Surfaces must be easy to clean because of high air humidity and condensation, and the wall and ceiling plaster must be able to withstand the conditions. Choose slip resistant floor coverings.

Consider the required noise insulation: the noise levels from domestic systems and appliances heard in neighbouring flats or adjoining rooms must not exceed 35 dB(A).

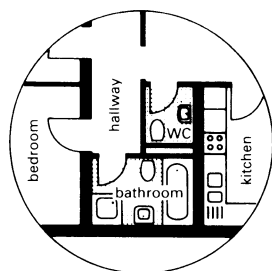
At least one sealed electrical socket should be provided at a height of 1.30m beside the mirror for electrical equipment. It is also necessary to consider the following for the bathroom/WC: cupboards for towels, cleaning items, medicines and toiletries (possibly lockable), mirror and lighting, hot water supply, supplementary heater, towel rails, drier, handles above the bathtub, toilet paper holder within easy reach, toothbrush holder, soap container and storage surfaces.



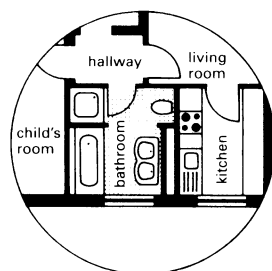
① Bathroom under roof with skylight



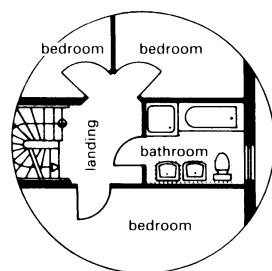
② Bathroom accessible from bedroom and via shower/WC



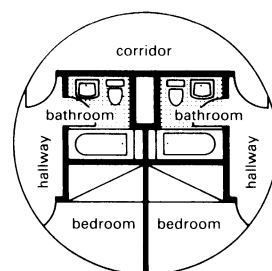
③ Bathroom accessed from corridor



④ Kitchen and bathroom with common utility wall

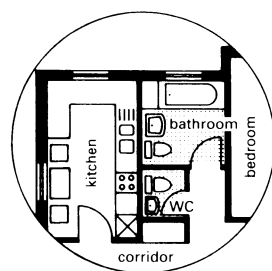


⑤ Typical bathroom in terraced house

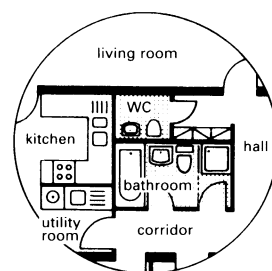


⑥ Typical hotel layout

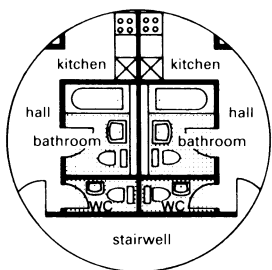
Nassauer Hof Hotel, Wiesbaden



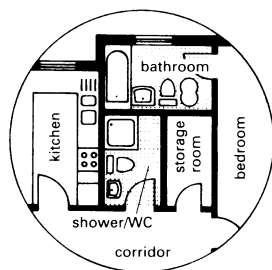
⑦ Kitchen, bathroom and WC on one utility wall



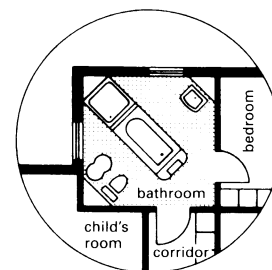
⑧ Kitchen, utility room, bathroom and WC centrally grouped



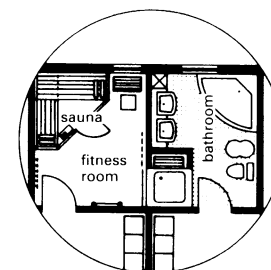
⑨ Kitchen, bathroom and WC on one utility wall



⑩ En suite bathroom and separate shower room



⑪ Spacious bathroom



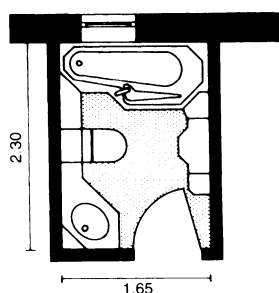
⑫ Bathroom and sauna (linked via shower)

BATHROOMS

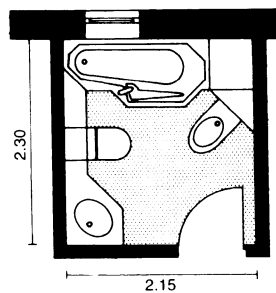
Planning Examples

Specially designed polyester baths (wide shoulder and narrow foot sections) and shower units offer space savings that make small rooms appear more spacious → ①-③.

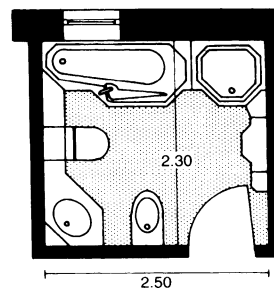
Baths with chamfered corners can be useful in renovation projects → ⑱.



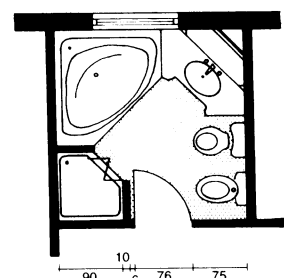
① Planning example: small bathroom



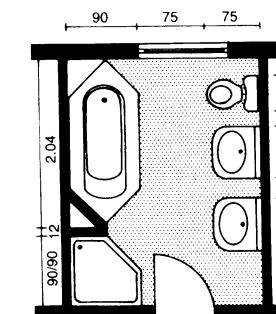
② As → ①, but 2.15 m wide



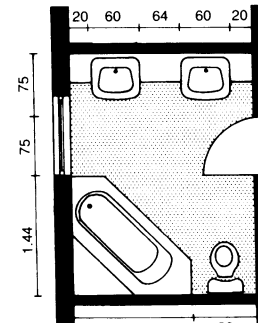
③ As → ①, but 2.50 m wide



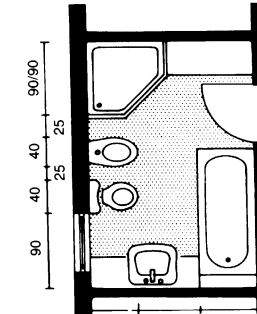
④ Small bathroom with corner bath



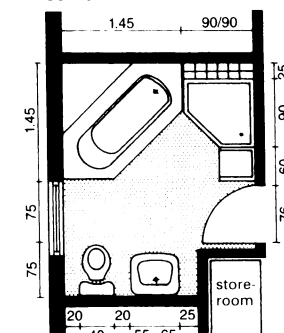
⑤ Six-sided bath and shower



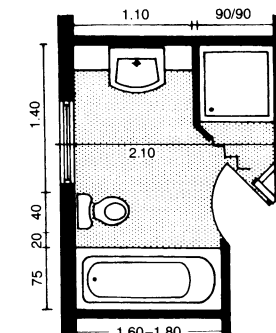
⑥ Corner bath



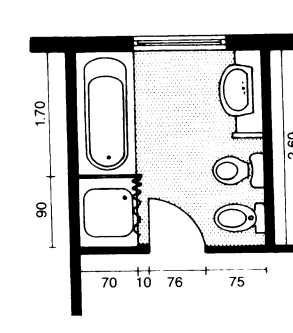
⑦ Shower and bath on 7 m²



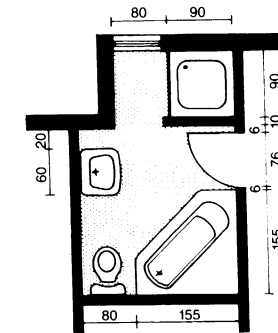
⑧ Corner bath and shower



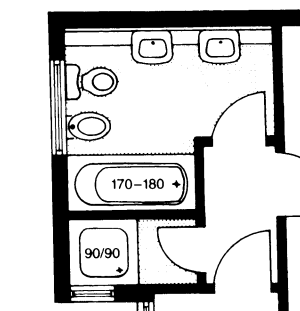
⑨ Bathroom with separate shower



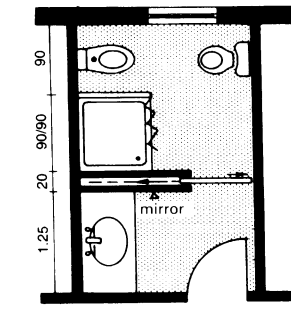
⑩ Double-sided arrangement



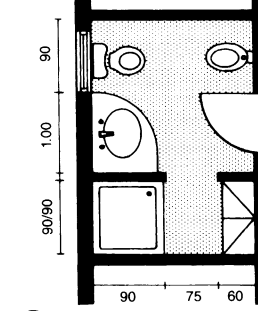
⑪ Separate shower area



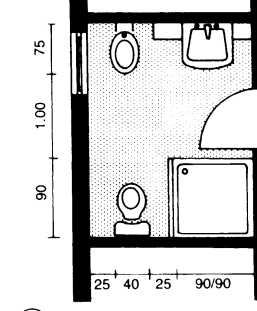
⑫ Shower and bath separated



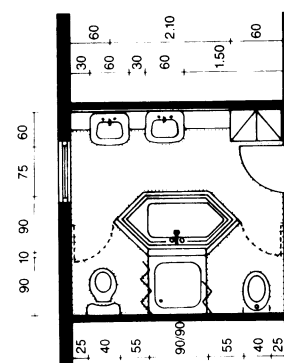
⑬ Separate washing area



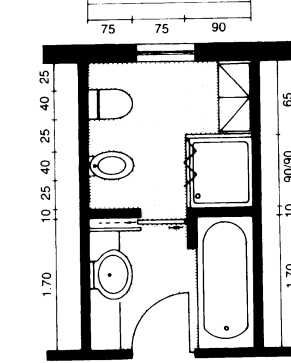
⑭ WC and shower separate



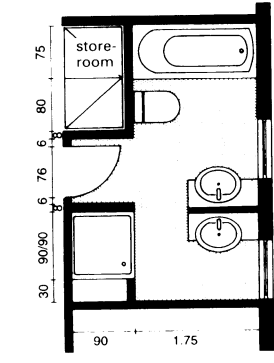
⑮ Shower, WC, bidet, basin



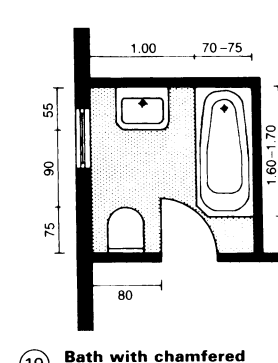
⑯ Spacious bathroom



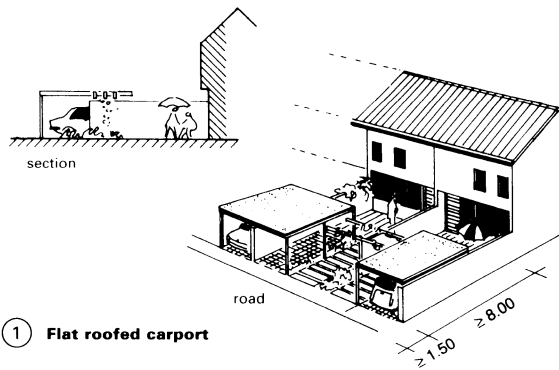
⑰ Bath and shower separated



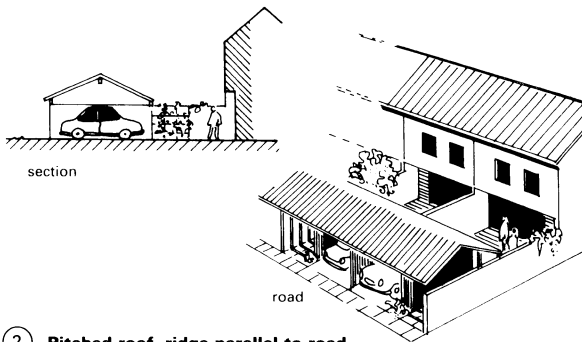
⑱ Bath and shower with separate washing area



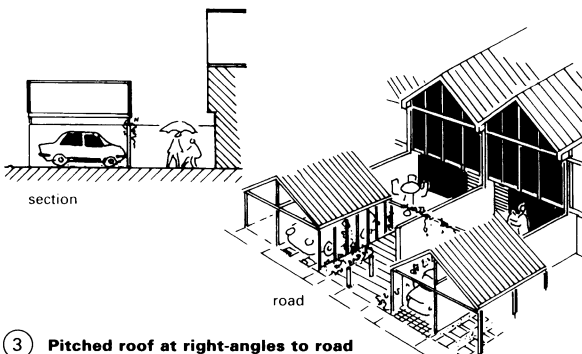
⑲ Bath with chamfered corner (necessitated by limited space)



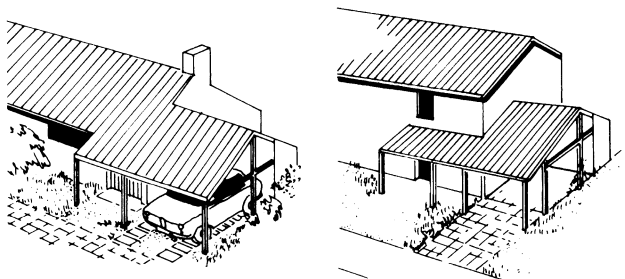
1 Flat roofed carport



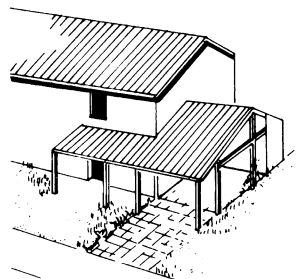
2 Pitched roof, ridge parallel to road



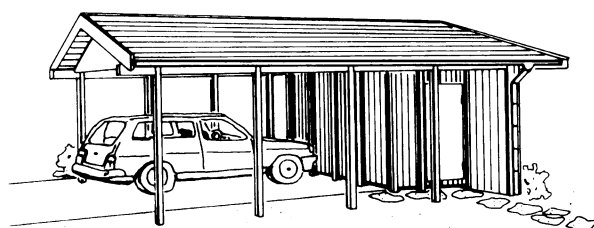
3 Pitched roof at right-angles to road



4 House with carport



5 Carport with two-storey house



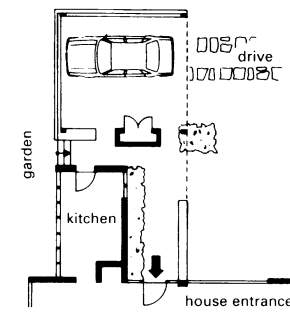
6 Carport with storeroom

Covered parking spaces (preferably with a solid wall on the weather side) provide an economical and space-saving way of providing adequate weather protection for vehicles.

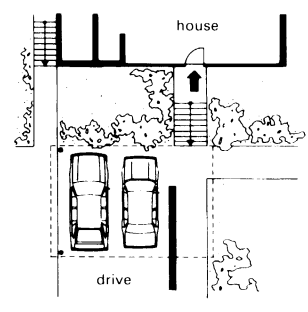
A combination of carport and lockable store (for bicycles etc.) is recommended → ⑥.

Carports are delivered as complete building kits, including post anchors, ironmongery and screws, as well as gutters and downpipes → ⑬ – ⑭.

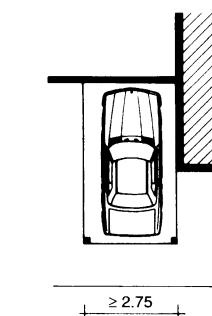
Examples of the lay-out and design of houses with covered parking bays are shown → ④ – ⑤.



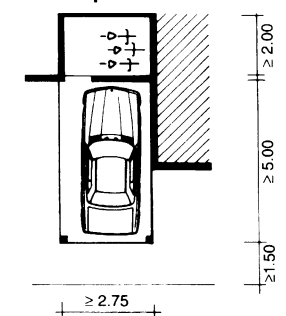
7 Carport convenient to house entrance



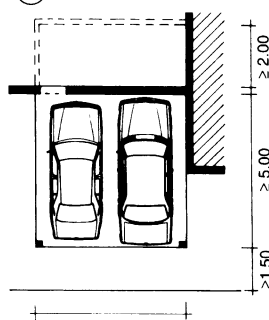
8 Double carport with separate house entrance



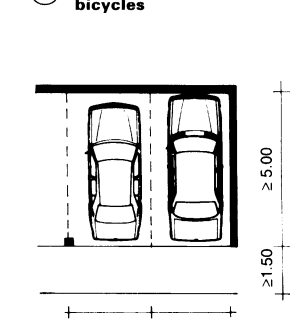
9 Carport for one car



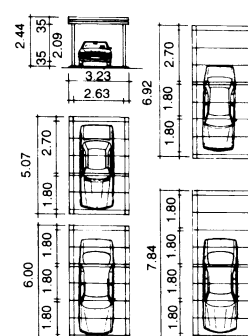
10 Carport for one car and bicycles



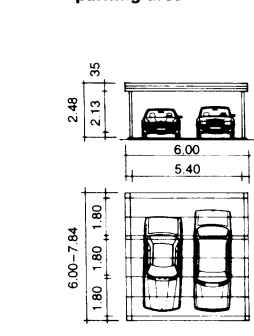
11 Two cars, room for bicycles



12 Common covered car-parking area

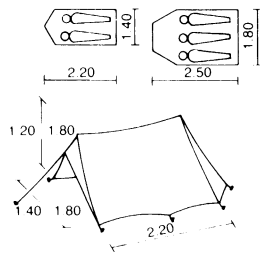


13 Individual carports (Osma/Gard)

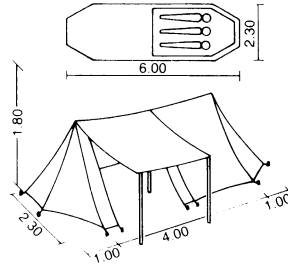


14 Double carports

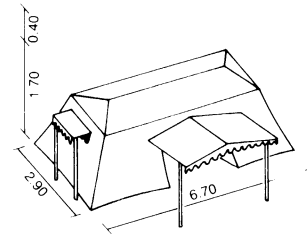
Tents



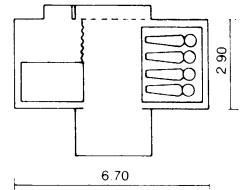
① Small tent with apse



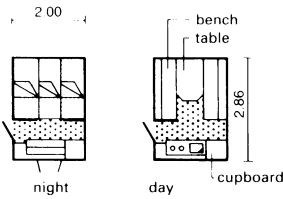
② With inner tent, two apses and canopy



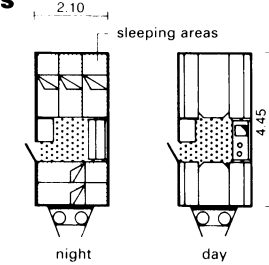
③ Large family tent with high lateral walls, inner tent, canopy and window



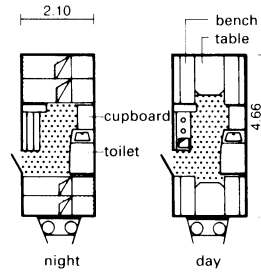
Caravans and campers



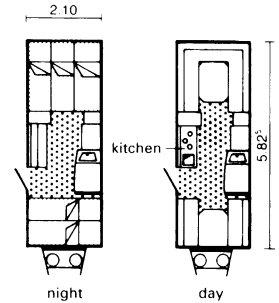
④ Caravan with three beds and built-in kitchen



⑤ Caravan with five beds

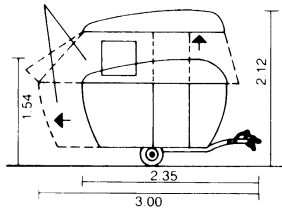


⑥ Caravan with four beds and toilet

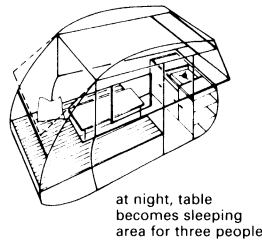


⑦ Caravan with five beds, toilet and kitchen

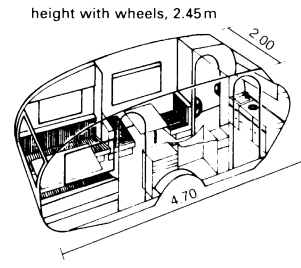
view of vehicle when open:
front and back sections
made of sailcloth



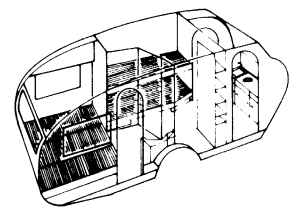
⑧ Fold-out caravan



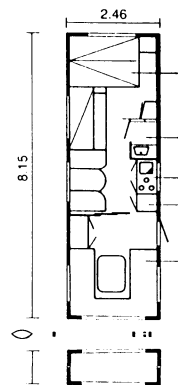
⑨ Perspective view of ⑧



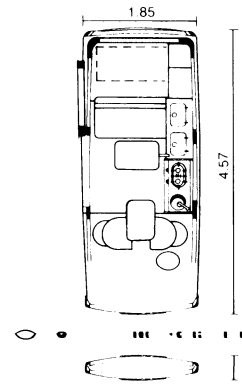
⑩ Caravan with areas for cooking and eating



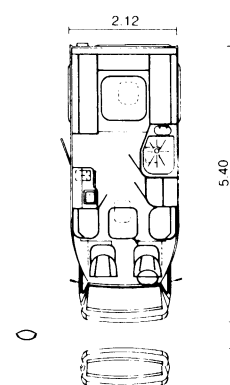
⑪ As ⑩, equipped for sleeping (for five people)



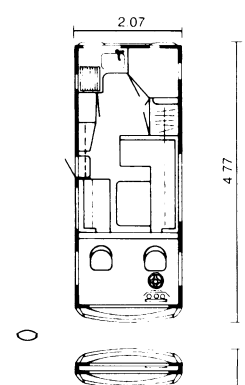
⑫ Large mobile caravan: sleeps eight to nine



⑬ Camper: Westfalia Joker 1/Club Joker 1

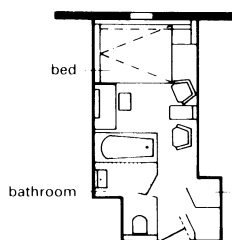


⑭ Camper: Tischer XL65

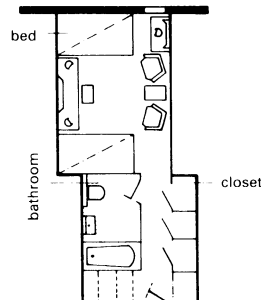


⑮ Camper: Lyding ROG2

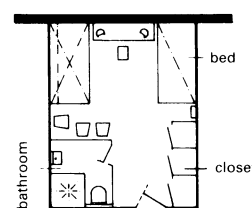
Ships' cabins



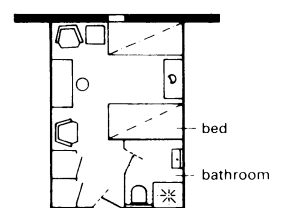
⑯ With a double bed and bath/toilet



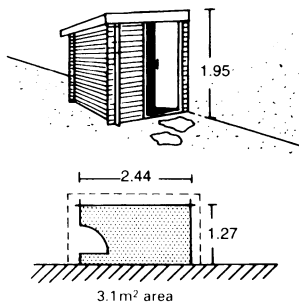
⑰ With two beds and bath/toilet



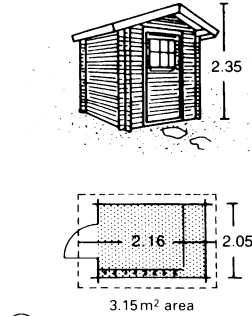
⑱ With one single and one bunk bed, shower/toilet



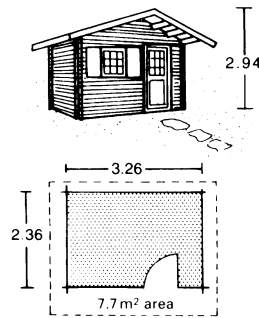
⑲ Twin cabin with shower/toilet



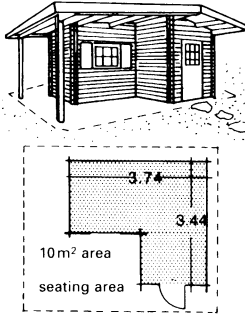
① Summer house added to main dwelling



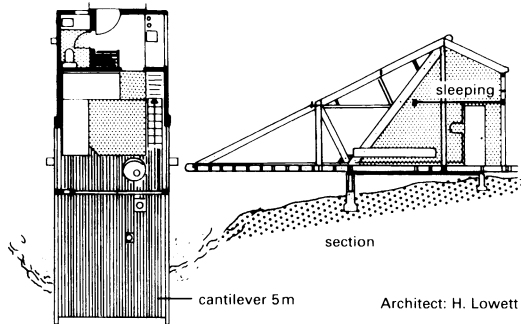
② Small summer house



③ With overhanging roof



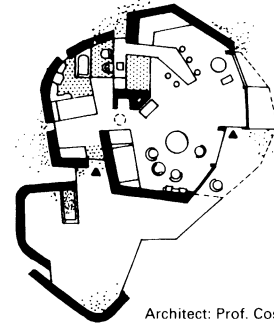
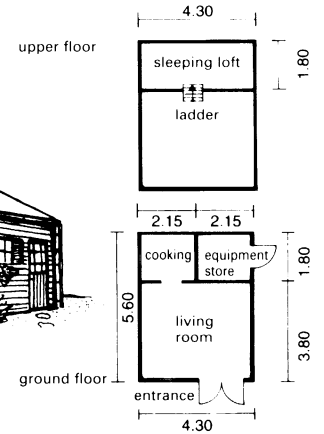
④ Log cabin



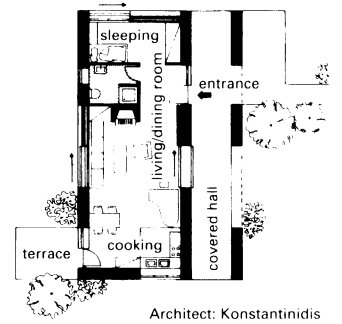
⑥ Timber weekend house for four people, 25 m² living area



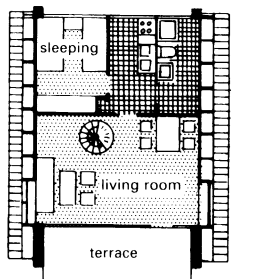
⑤ Log cabin with sleeping loft



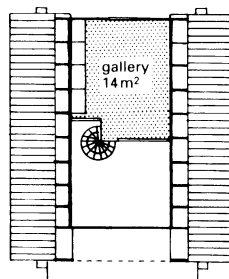
⑦ Holiday house in Belgium



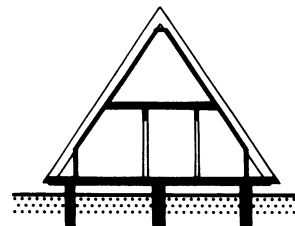
⑧ Holiday house in Greece



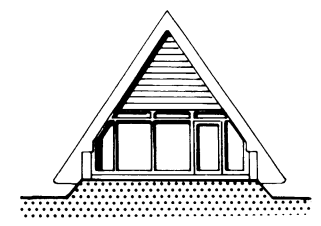
⑨ Ground floor → ⑩



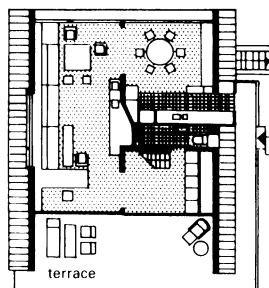
⑩ Loft → ⑪ + ⑫



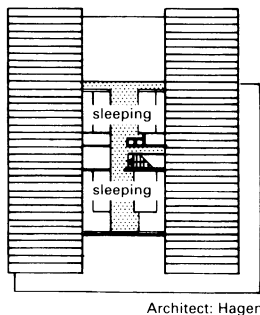
⑪ Section → ⑨



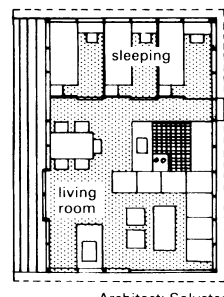
⑫ Elevation → ⑨



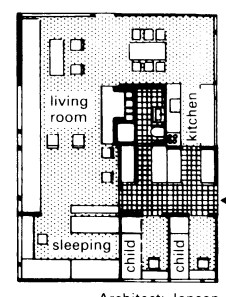
⑬ Ground floor of holiday house in Nordseeland



⑭ Upper floor → ⑬



⑮ Weekend house

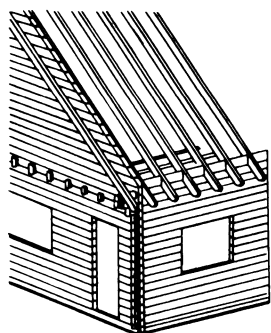


⑯ Holiday house in Bornholm

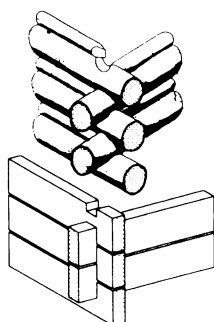
Factors to take into account when assessing a plot are: prevailing wind direction, groundwater, drinking water supply, drainage, heating, access and parking space for cars. Whenever possible, construction should be from natural local materials (stone or wood). For security reasons, furnishings should be secured and entrances fitted with lockable shutters to protect against theft.

TIMBER HOUSES

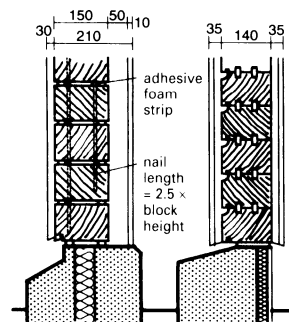
The oldest form of timber housing consisted of prepared logs or blocks placed one upon the other and structurally connected by rebated corner joints. Today, the most common form is timber framed housing (also balloon framed or half-timbered construction). Vertical loads are transmitted to the ground through structural posts giving an economic form of construction that fulfils all the requirements in relation to building physics, quality, structure and comfort. The most important precaution is to protect the façade cladding to prevent water from penetrating the timber. Plan the cladding so that the rain flows off quickly and, where splashing occurs, design for the replacement of parts. Also plan for sufficient roof overhang.



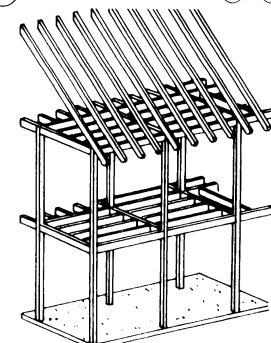
1 Timber construction → 2 + 3



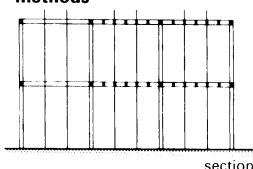
2 Log and block construction methods



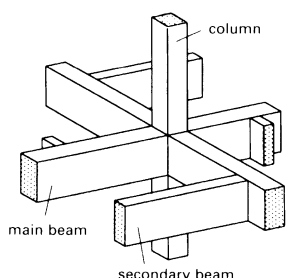
3 Solid timber walls



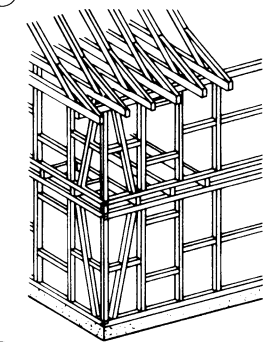
4 Timber frame



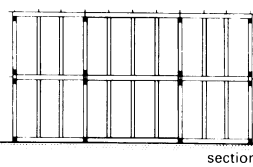
5 Section/plan → 4 plan



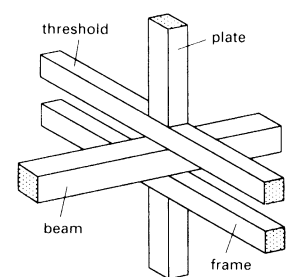
6 Node: continuous column



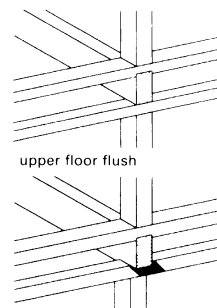
7 Visible frame



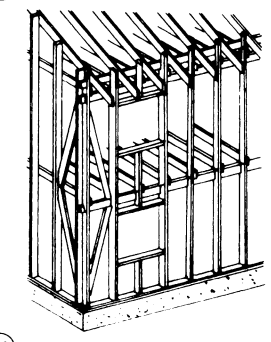
8 Section/plan → 7 plan



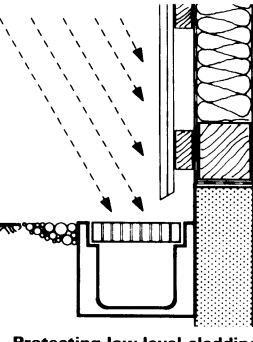
9 Joints in half-timbered frame



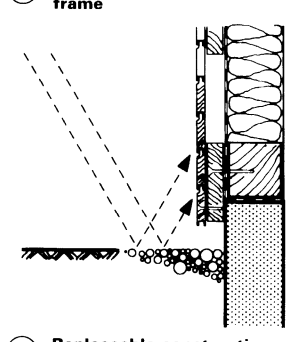
10 Projecting upper floors



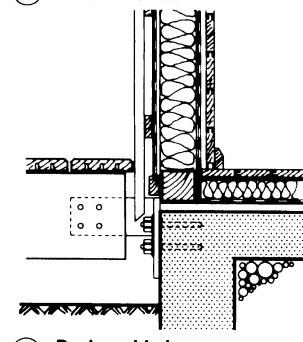
11 Balloon frame made with studs



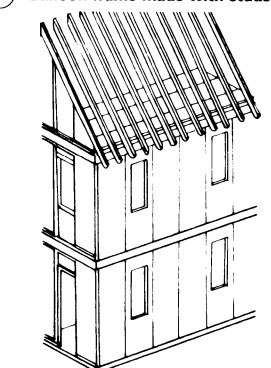
12 Protecting low-level cladding against water splashes



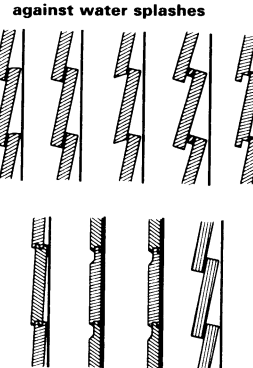
13 Replaceable construction of heavily weathered cladding



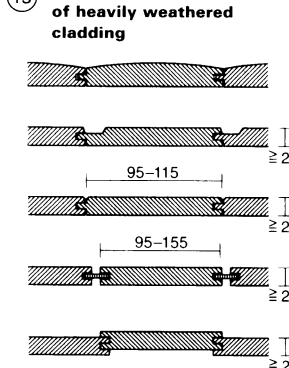
14 Replaceable beams or terrace supports



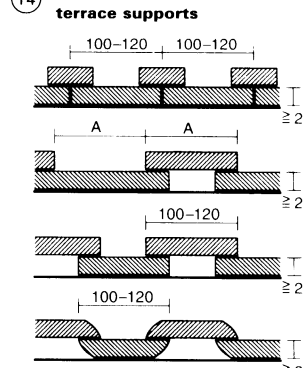
15 Panel construction



16 Horizontal cladding

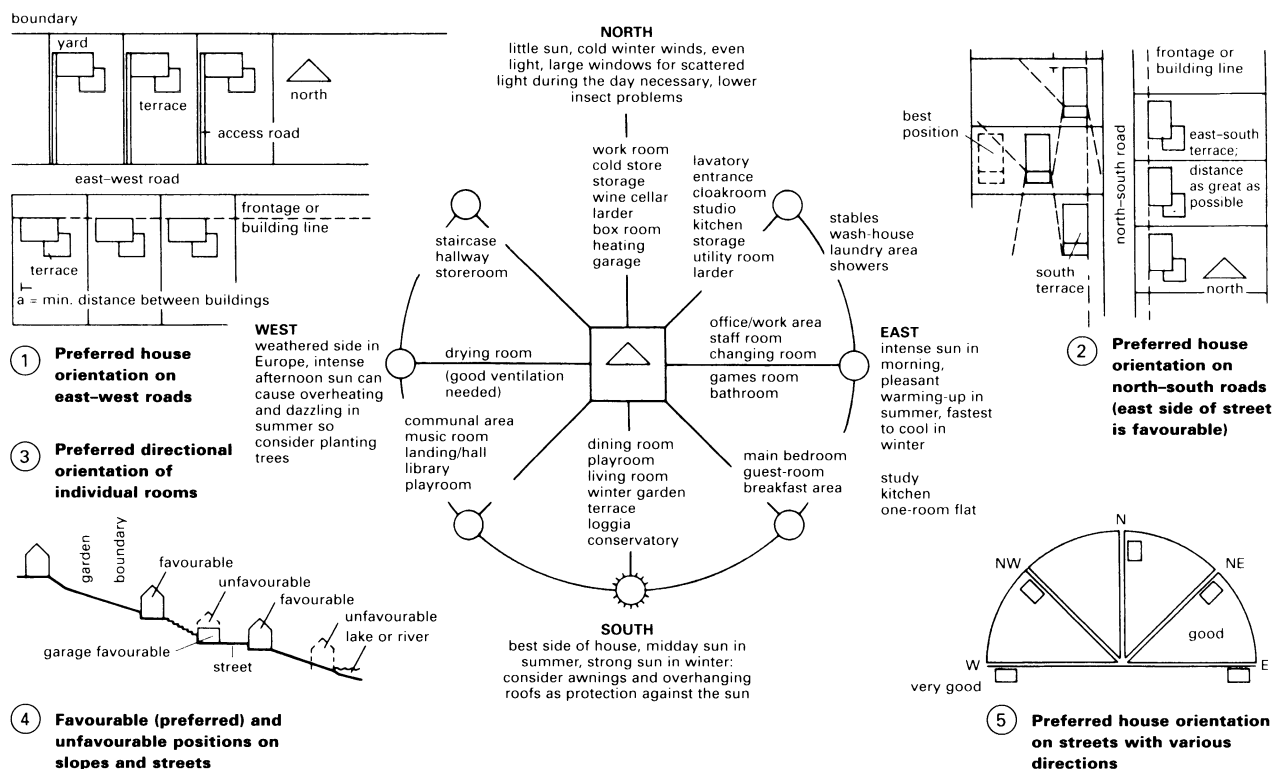


17 Vertical cladding



18 → as 17

HOUSE ORIENTATION



Optimal residential sites

As a rule, sites to the west and south of towns and cities are preferred for residential development in areas where the prevailing winds are generally southerlies or westerlies (e.g. many parts of western Europe). This means the houses receive fresh air from the countryside while urban pollution is dissipated to the north and east. These latter areas, therefore, are not desirable for housing and should instead be considered for industrial buildings. Note that in mountainous areas or by lakes the wind behaviour described above may be different. For example, sunny southern and eastern slopes in the north and west of a city located in a valley basin could be sought-after locations for the construction of private homes.

Plots located on mountain slopes

Plots located on the lower side of mountain roads are particularly favourable because they offer the possibility of driving directly up to the house, where a garage can be located, and leave a tranquil rear garden with an uninterrupted view and sun. On the upper side of the street, this is far harder to provide and walls and concrete ditches are usually necessary behind the house to guard against falling rocks and collect rainwater running off the mountain.

Plots located by water

The potential nuisance from mosquitoes and foggy conditions make it inadvisable to build too close to rivers and lakes.

Orientation relative to the street

For separate houses with boundary walls, the most favourable plots are usually situated south of the street so that all auxiliary rooms, together with the entrance, are then automatically positioned facing the street. This solves any privacy problems because it leaves the main living and sleeping areas located on the quiet, sunny side (east-south-west), facing away from the street and overlooking the garden. If the plot has sufficient width, large French windows, terraces and balconies can be used to good effect. → ①









Plots are generally narrow and deep in order to keep the street side as short as possible. If the plot is situated to the north of the street, the building should be located towards the rear, despite the extra costs of a longer access. This is in order to take advantage of the sunny front garden area. Buildings on such plots can be impressive when seen from the street. → ①

Plots on the east of streets running north-south → ② are the most favourable in areas with westerly prevailing winds because gardens and living areas then face east, which is the most sheltered. Additionally, it is less likely that there will be neighbouring buildings close enough to obstruct low sun in the east. To take advantage of winter sun (low in the southern sky), the buildings must be situated close to the northern boundary so a large area of terrace can be south-facing. Plots on the west of a north-south street should be planned in a way that maximises the amount of southern sunlight received and gives an unobstructed view from the terrace. This might require the house to be built on the rear boundary → ②. The most favourable plots for houses in streets running in other directions are shown in → ⑤.

Plots adjacent to existing houses built on the sunny side have the advantage that the position and ground-plan of the new house can be designed in a way that ensures the sun will not be obstructed at any time in the future.

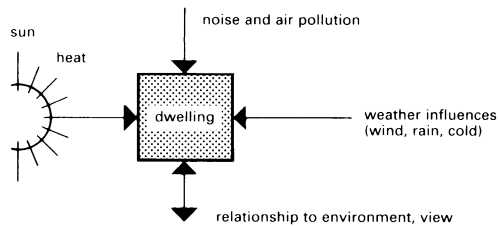
Room orientation

Whenever possible, all living and sleeping areas should face towards the garden on the sunny side of the house, with the utility areas on the opposite side → ③. This allows rooms that are occupied for the most time to take advantage of natural solar heating. Use of a local sun diagram (pp. 164 and 165) will indicate when the sun will shine into a room, or a part thereof, at a particular hour for any season. This information may also be used to decide which way the building should be orientated and where it should be placed to avoid being shaded by neighbouring buildings, trees and the like.

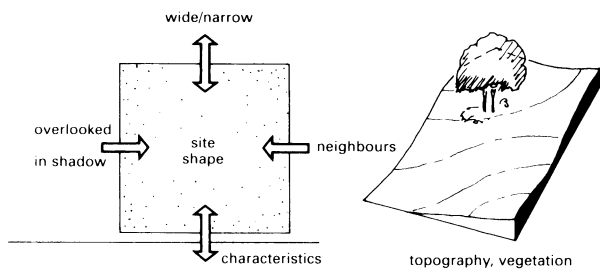
	house type, buildings with attached plot	detached single family home		semi-detached house		linked houses (with yard)		terraced house		
										
characteristics										
1	minimum front width (m)	20	20	15	13	13.5	15 (13.5)*	5.5	5.5	7.5
2	plot depth, minimum (m)	22	20	20	20	18.5	17.5	24	30	25
	plot depth (preferred value)	(25)	(25)	(25)	(25)	(25)	(20)	(26)		
3	minimum size of plot (m ²)	440	400	300	260	250	262 (236) (300)	130	165	188
		(500)	(500)	(375)	(325)	(338)		(143)		
4	additional area for separate garage or parking space (m ²)	—	—	—	—	—	(30)	30	—	—
5	plot area = net land for construction (3 + 4) (m ²)	440	400	300	260	250	262 (266) (330)	160	165	188
		(500)	(500)	(375)	(325)	(338)		(173)		
6	normal number of storeys	1	1 1/2	1 1/2	2	(1) – 2	1	2		
7	average gross floor area/house (m ²)	150	160	150	160	150	150	130	130	150
8	floor area index (calculated)	0.34 (0.3)	0.4 (0.32)	0.5 (0.4)	0.62 (0.5)	0.6 (0.45)	0.57 (0.45)	0.8 (0.75)	0.78	0.79
9	maximum permitted floor area index**	0.5		0.5		0.8		0.8		
	maximum permitted land use ratio**	0.4		0.4		0.4		0.4		
10	average occupancy (occupants/dwelling)	3.5		3.5		3.5		3.5		
11	net residential density (dwellings/hectare)	22	25	33	38	40	38	62	60	53
	maximal variance	20 – 25		26 – 38		29 – 40		50 – 62		
12	net residential density (occupants/hectare)	77	88	116	133	140	133	217	210	186
	maximal variance	70 – 90		90 – 130		100 – 140		170 – 210		

* without garage on the property
** village and residential areas

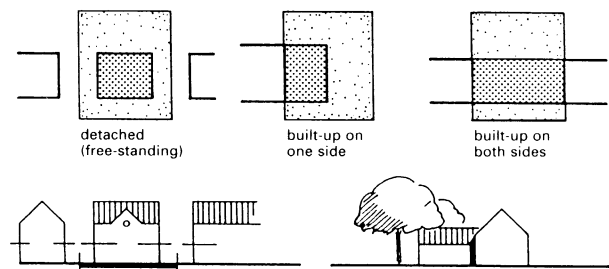
1 Summary of typical housing densities



2 The relationship between dwellings and surroundings

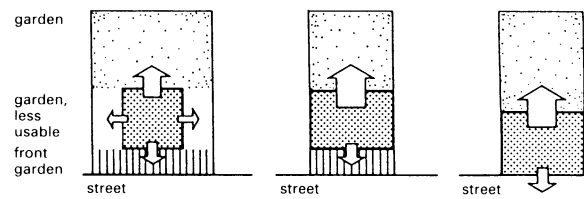


3 Relationship between dwelling and plot



design-related integration with regard to architecture and vegetation

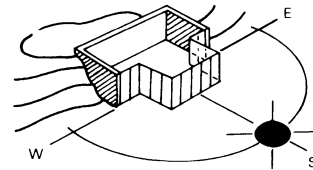
4 Positioning of the house on the plot and integration in the neighbourhood



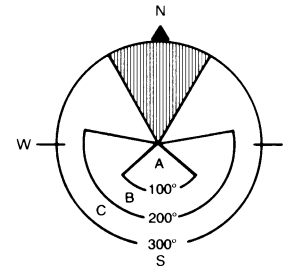
5 Plot zones and the impact on the design of the dwelling plan (the arrangement of rooms, functional areas)

principal use of space	principal period of use; desired orientation of the sun	
living area	afternoon to evening	
eating area/dining room	morning to evening	
children's room	afternoon to evening	
bedroom	night: morning sun desired	

① Orientation of living spaces



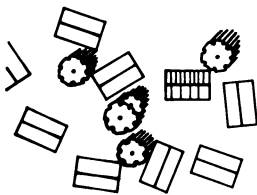
② Orientation of living space



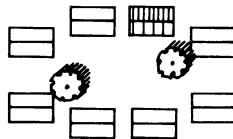
③ Annual insolation (solar orientation)

In addition to complementing the overall features of the site and satisfying the requirements of access and spatial relationships between buildings the arrangement of the houses on the site plan should have an orientation based on the path of the sun. This allows the architect to produce a design that gives the optimum levels of sunlight in specific parts of the dwelling at certain times of the day.

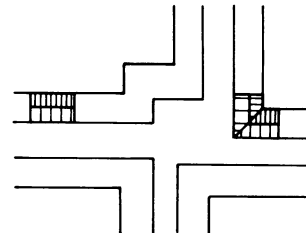
- A: 100° sun on the shortest winter's day
- B: 200° sun from the beginning of spring to the end of autumn
- C: 300° sun on the longest summer's day



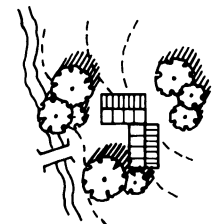
④ In a village setting



⑤ On a housing estate



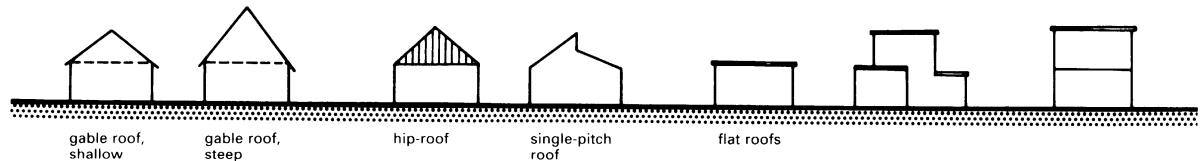
⑥ In an 'urban' plan



⑦ In the country

successful integration of houses into urban and country environments demands a flexible approach to designing the dwelling plan and must take into account the site-specific features (other houses in the vicinity, streets, plazas or the natural terrain) to create housing that is compatible with the surroundings

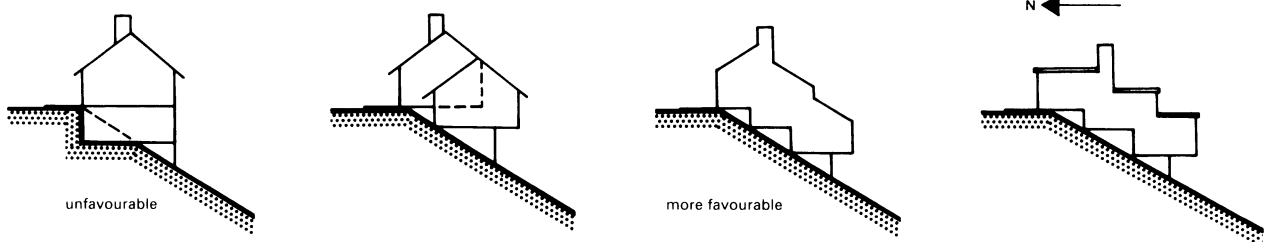
adaptability of dwellings to topography



⑧ Level building ground

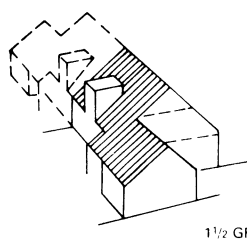


⑨ Undulating ground; building on slopes

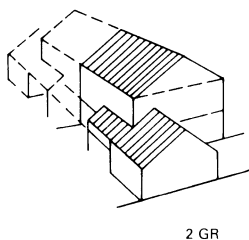


⑩ Steeply inclined slopes

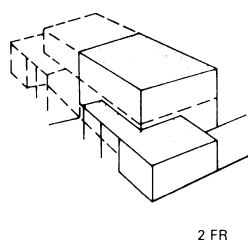
Examples of Typical Designs



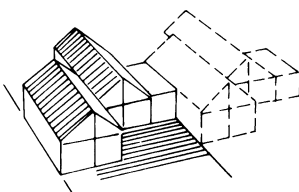
1 1/2 GR



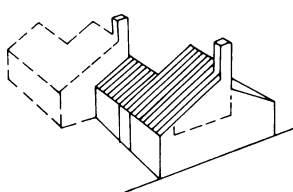
2 GR



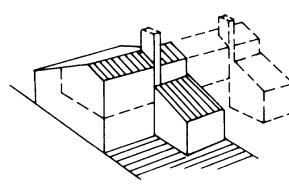
2 FR



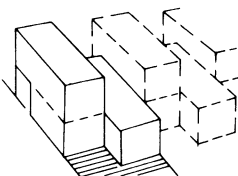
1 GR



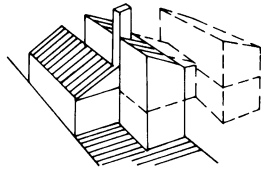
1 1/2 SPR



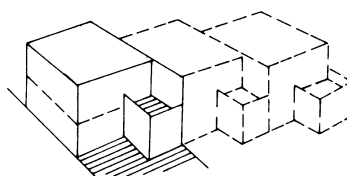
1 1/2 GR



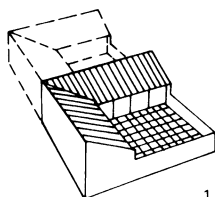
1 1/2 FR



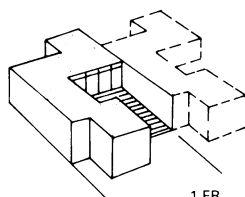
1 1/2 SPR



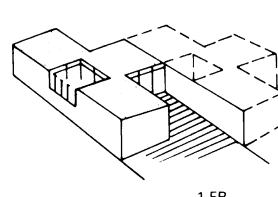
2 FR



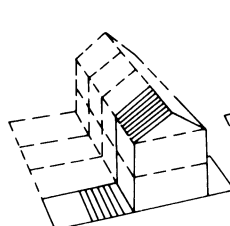
1 SPR



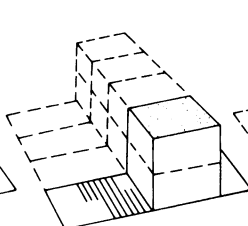
1 FR



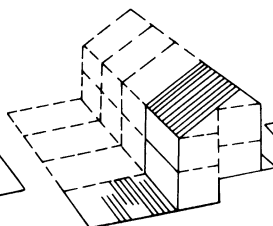
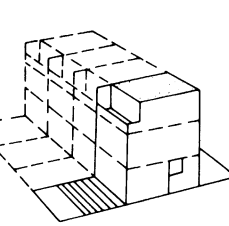
1 FR



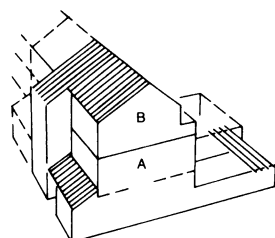
2 GR



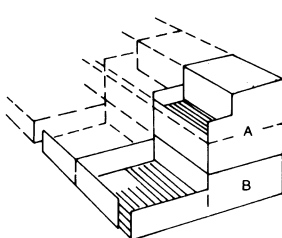
2 FR


2 GR
(staggered storeys)


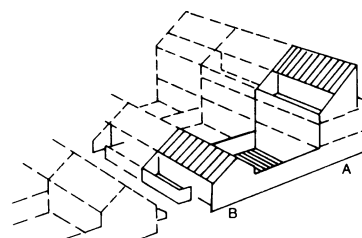
3 FR



3 GR



3 FR



1 GR

2 1/2 SPR

A: main residence

B: separate residence

A: main residence

B: separate residence

A: main residence

B: separate residence

key
1, 1 1/2: number of storeys
GR: gable roof
SPR: single-pitch roof
FR: flat roof

key
1, 1 1/2: number of storeys
GR: gable roof
SPR: single-pitch roof
FR: flat roof

HOUSING TYPES

1 Semi-detached housing

Frequently employed by developers and based on the use of identical designs. Also used on single-plot projects but rarely are the two halves individually designed. Garages or car ports are often included on the side boundaries.

2 Linked housing

Usually used only by developers undertaking large-scale residential projects. The groups of houses are built with uniform plans and designs and can be laid out in compact or spacious configurations. Garages or parking spaces can be incorporated in the individual plots or a separate parking area provided.

3 Houses with courtyard gardens

Can be planned as individual buildings or as groups with coordinated design. Groups are usually considered only for large developments. Include individual garages or a communal parking area.

4 Terraced houses

A shared building form that gives rows of identical (or slightly varied) houses. Parking is usually on-street or in communal car parks.

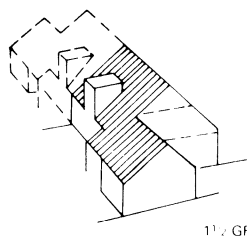
5 Town houses

Another shared building form resulting in rows of houses that are identical or contain a matching variety of designs. Parking space may be on the plot, on-street, or in communal car parks. As with all these examples, design coordination and regulatory agreements are necessary.

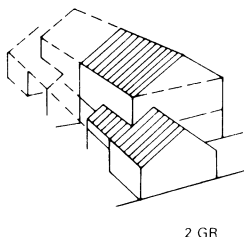
ments are necessary.
ation and regulatory agree-
ments and regulatory agree-
ments are necessary.

HOUSING TYPES

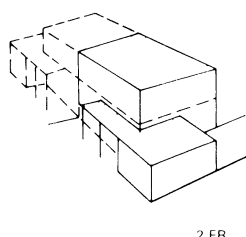
Examples of Typical Designs



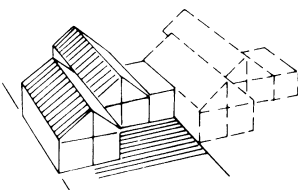
1 1/2 GR



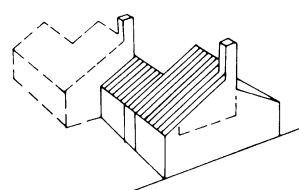
2 GR



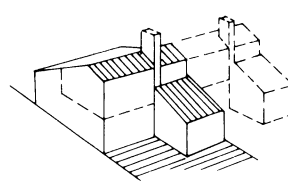
2 FR



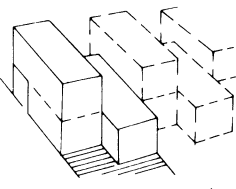
1 GR



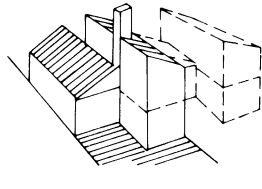
1 1/2 SPR



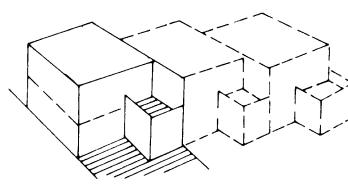
1 1/2 GR



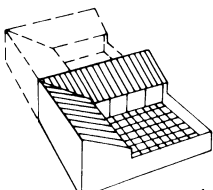
1 1/2 FR



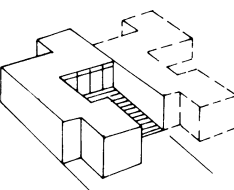
1 1/2 SPR



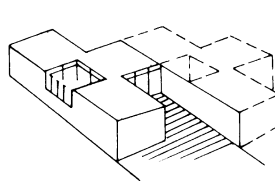
2 FR



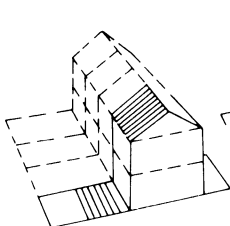
1 SPR



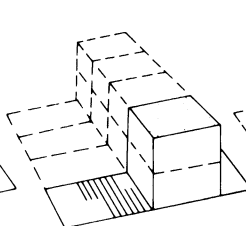
1 FR



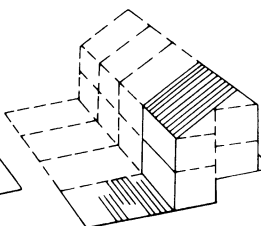
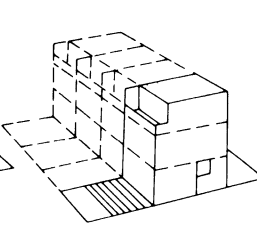
1 FR



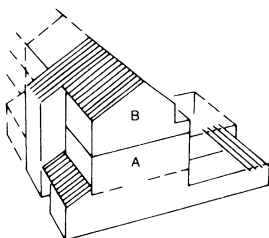
2 GR



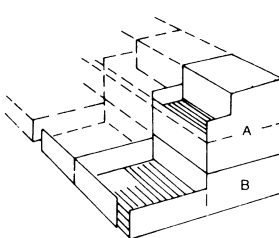
2 FR


2 GR
(staggered storeys)


3 FR



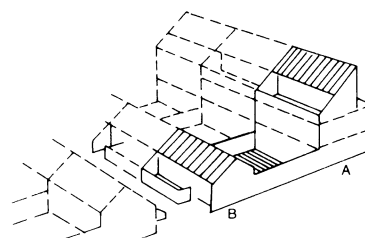
3 GR



3 FR

A: main residence

B: separate residence



1 GR

2 1/2 SPR

key
1, 1 1/2: number of storeys
GR: gable roof
SPR: single-pitch roof
FR: flat roof

1 Semi-detached housing

Frequently employed by developers and based on the use of identical designs. Also used on single-plot projects but rarely are the two halves individually designed. Garages or car ports are often included on the side boundaries.

2 Linked housing

Usually used only by developers undertaking large-scale residential projects. The groups of houses are built with uniform plans and designs and can be laid out in compact or spacious configurations. Garages or parking spaces can be incorporated in the individual plots or a separate parking area provided.

3 Houses with courtyard gardens

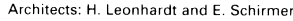
Can be planned as individual buildings or as groups with coordinated design. Groups are usually considered only for large developments. Include individual garages or a communal parking area.

4 Terraced houses

A shared building form that gives rows of identical (or slightly varied) houses. Parking is usually on-street or in communal car parks.

5 Town houses

Another shared building form resulting in rows of houses that are identical or contain a matching variety of designs. Parking space may be on the plot, on-street, or in communal car parks. As with all these examples, design coordination and regulatory agreements are necessary.



ground floor variation

Architects: K. and B. Woicke



terrace

living

dining

kitchen

open-air seating

garage

grassed area

refuse/equipment

living

dining

kitchen

upper floor

parents

bath

child

children

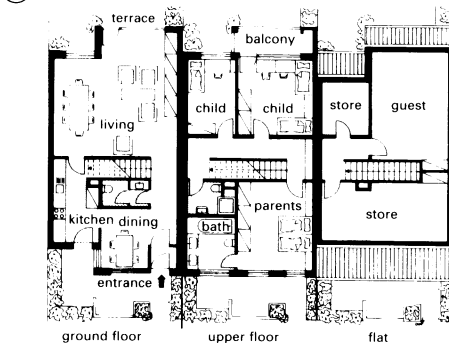
bath

parents

balcony

Architect: Herma

⑦ **Ground floor** → ⑧



terrace

living

dining

kitchen

lobby

stairs to self-contained flat

terrace

balcony

child

child

bath

store

parents

upper floor

WC/sh

kitchen

living

sleeping

store

terrace

self contained flat in roof

Architect: Kulka

Architects: Kulka/Neufert

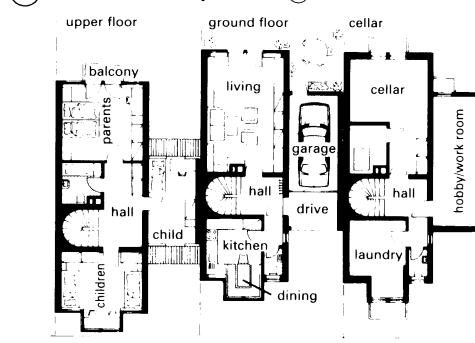
terrace house, first floor, and stairs

The floor plan is divided into two main sections: the ground floor and the upper floor. The ground floor features a large living area with a fireplace, a dining area, a kitchen, a hobby room, and a terrace. The upper floor includes a studio, a guest room, a parents' room, a child's room, a bathroom, and a balcony. A north arrow and a heating symbol are located in the top left corner.

basement floor

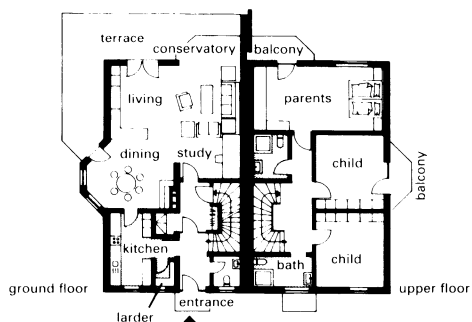
self-contained flat in roof

⑧ **Basement and top floor** → ⑦

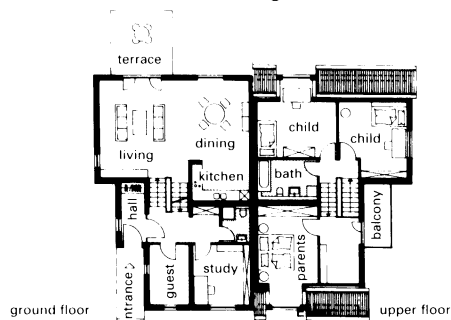


277

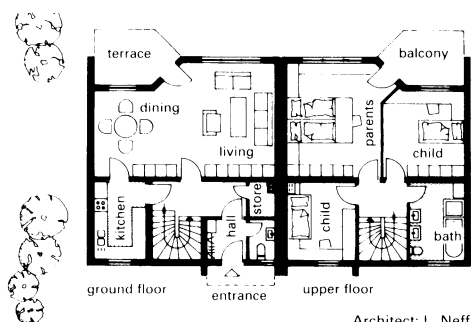
SEMI-DETACHED HOUSES



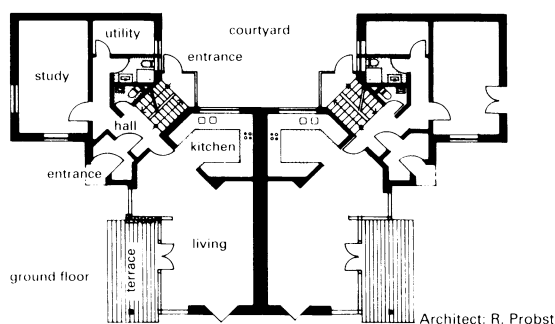
1 Semi-detached houses with dining room and surrounding terrace



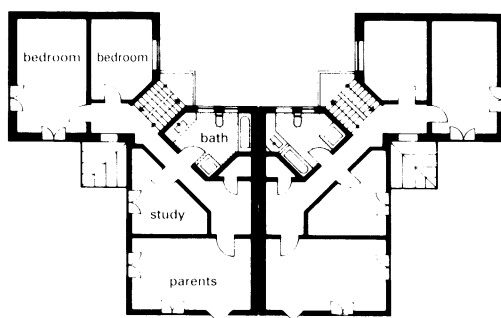
2 Semi-detached houses with off-set levels



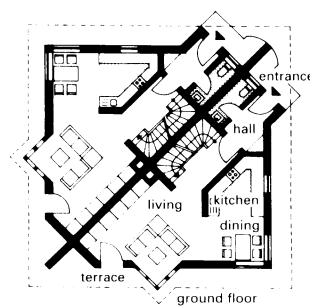
3 Semi-detached houses with square plan



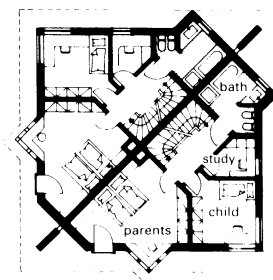
4 L-shaped semi-detached houses with courtyard



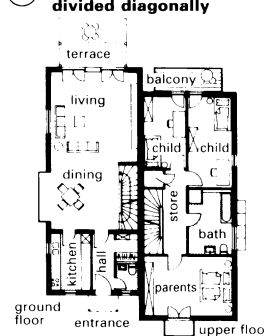
5 Upper floor → 4



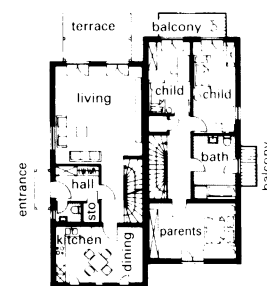
6 Semi-detached houses divided diagonally



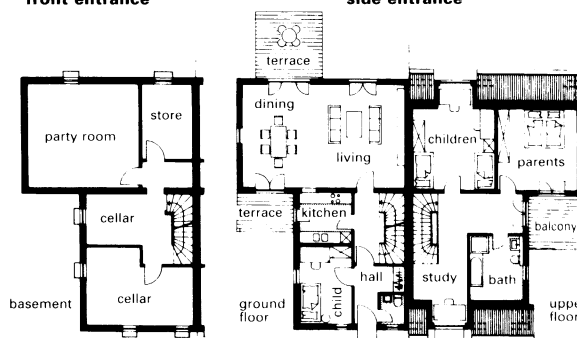
7 Upper floor → 6



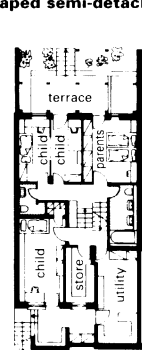
8 Semi-detached houses with front entrance



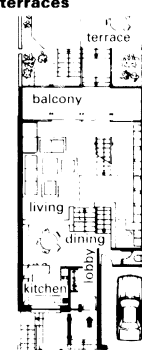
9 Semi-detached houses with side entrance



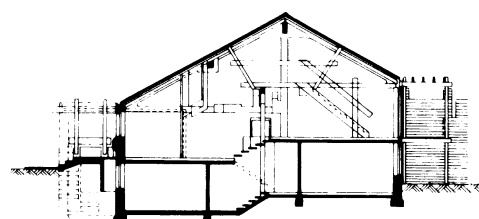
10 L-shaped semi-detached houses with two terraces



11 Semi-detached house basement



12 Ground floor



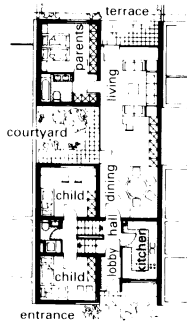
Architects: Hoyng, Nettek, Sandfort

13 Cross-section → 11 + 12

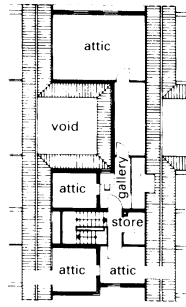
COURTYARD HOUSES

By using courtyards it is possible to provide additional living space that is both sheltered and private. In contrast to detached housing, courtyard developments allow a high quality of life to be offered to occupants using only a comparatively small amount of land area.

Enclosed courtyards can be as small as a living room but might need to be artificially lit if the surrounding walls are all higher than one storey. If, however, a garden courtyard is required much larger areas are desirable to take full advantage of the sunlight and allow a full range of plants to be considered.

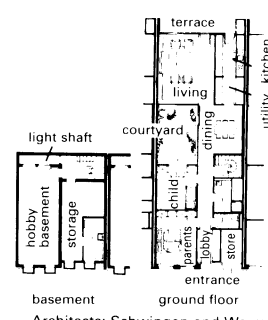


① Ground floor → ②



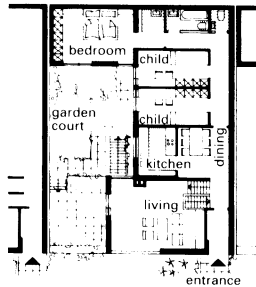
② Upper floor

Architect: A. Hennig



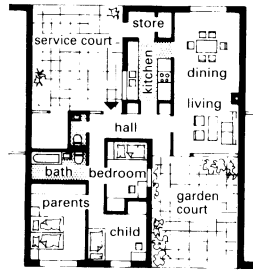
③ 180 m² living area

Architects: Schwingen and Wermuth



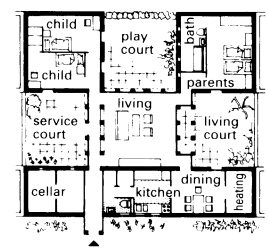
Architects: Kuhn, Boskamp and Partners

④ Courtyard house with directly accessible open area



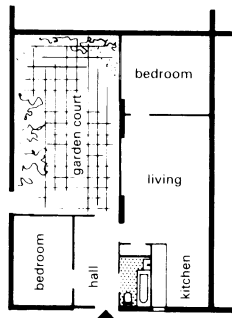
Architects: Latty and Tucker

⑤ House with garden and service court

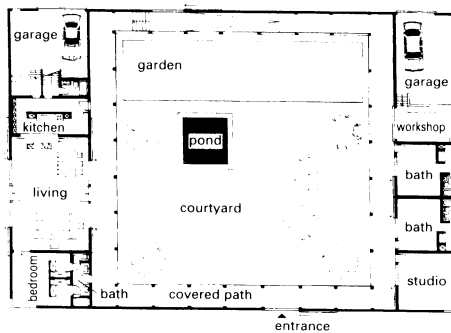


Architect: Ungers

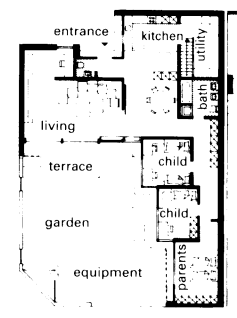
⑥ Differentiated courtyards



⑦ Ground floor and courtyard

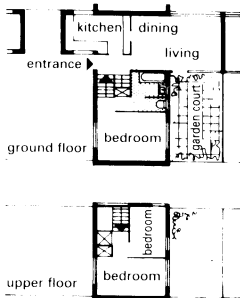


⑧ House with courtyard in California



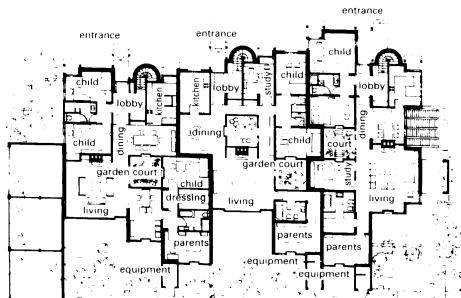
Architect: C. Papendick

⑨ Courtyard house, ground floor



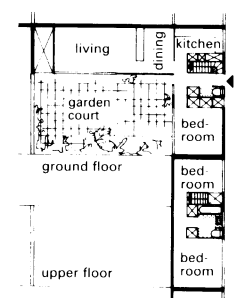
Architect: Chamberlin

⑩ Courtyard house on two floors



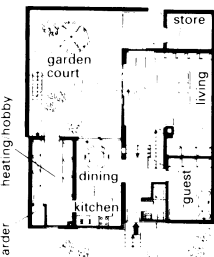
Architect: Bahlo, Köhnke, Stosberg and Partners

⑪ Single-family courtyard houses

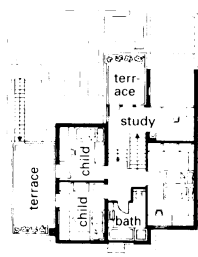


Architect: Butler

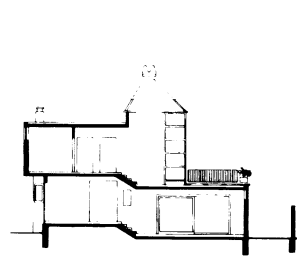
⑫ Two-storey patio house



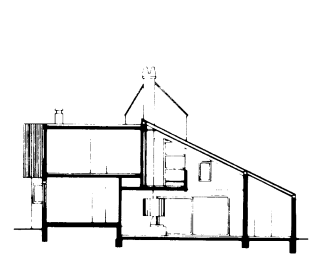
⑬ Ground floor



⑭ Upper floor



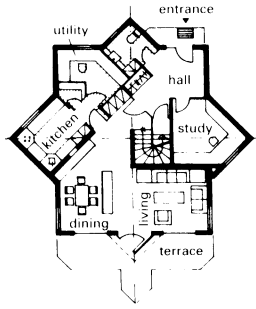
⑮ Section → ⑬ + ⑭



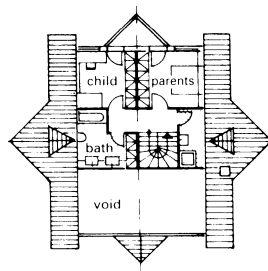
Architects: Jacobs and Wiedemann

⑯ Section

DETACHED HOUSES

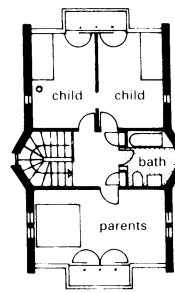


1 Ground floor → 2

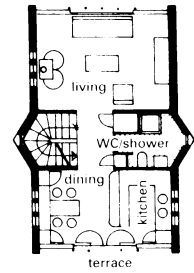


2 Upper floor

Architect: L. Neff

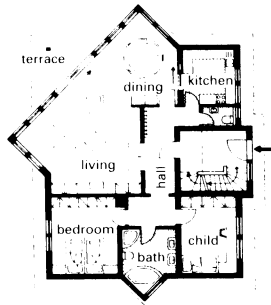


3 Upper floor → 4

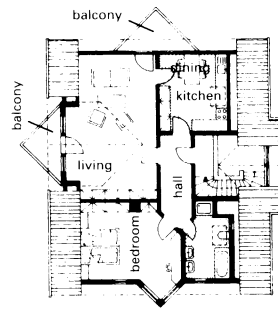


4 Ground floor

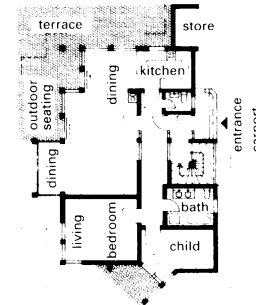
Architect: R. Gray



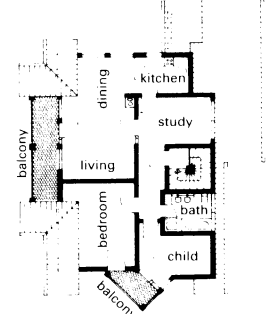
5 Ground floor → 6



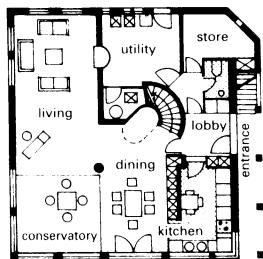
6 Upper floor



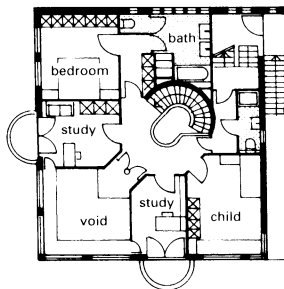
7 Ground floor → 8



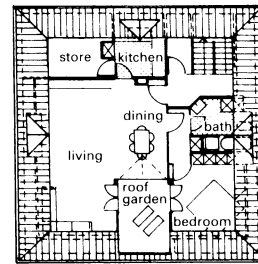
8 Upper floor



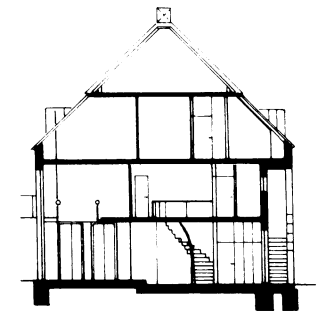
9 Ground floor → 10 - 12



10 Upper floor

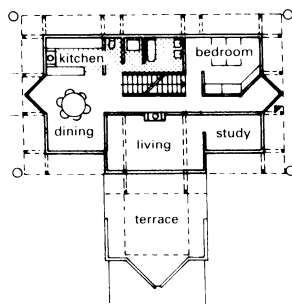


11 Attic floor

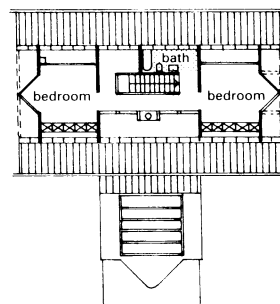


12 Section

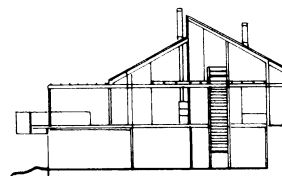
Architect: Brons



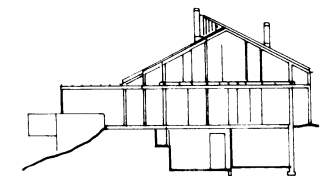
13 Ground floor → 14 - 16



14 Upper floor

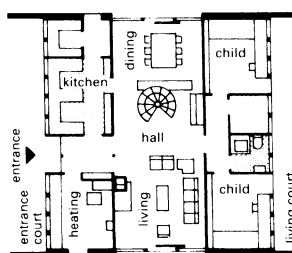


15 Section

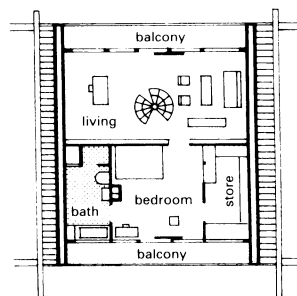


16 Section

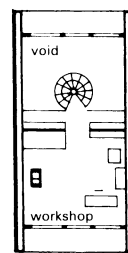
Architects: Tissi and Pötz



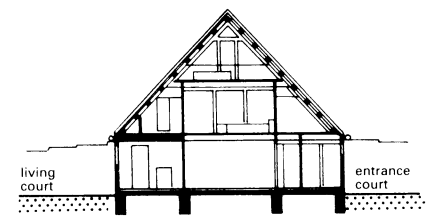
17 Ground floor → 18 - 20



18 Upper floor



19 Attic floor



20 Section

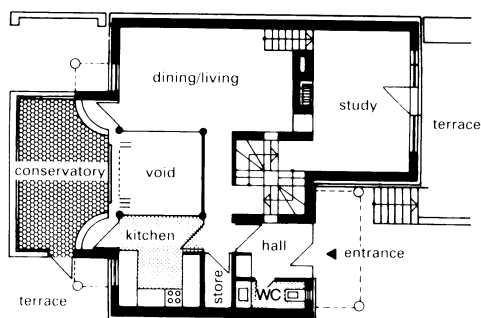
Architect: Heckrott

HOUSES WITH CONSERVATORIES

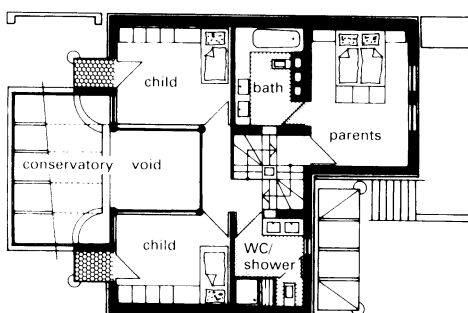
Conservatories are not simple glass buildings, but complex systems that must be designed with technical precision. Depending on the different uses of the conservatory, the glass system, the ventilation and shading must be harmonised in order to make it work satisfactorily.

A conservatory provides a buffer zone between the outside climate and the interior of the house. Glass structures work as solar energy collectors and in favourable climatic circumstances the potential energy savings for the whole house can be about 25%. A westward orientation of the conservatory can substantially raise the environmental quality of the habitat.

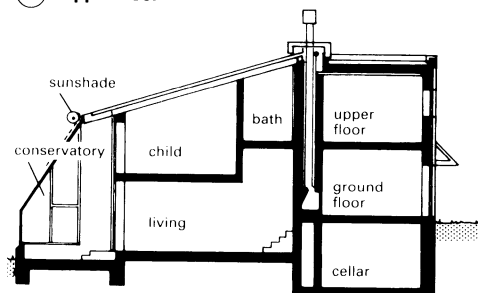
It is recommended that glass doors are incorporated in the transition area between the house and the conservatory in order to separate both spaces from a heating point of view and for reasons of comfort within the house and energy efficiency.



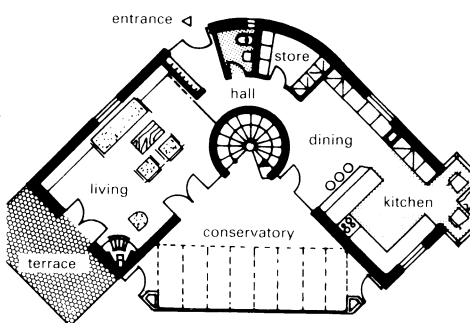
1 Ground floor → 2 + 3



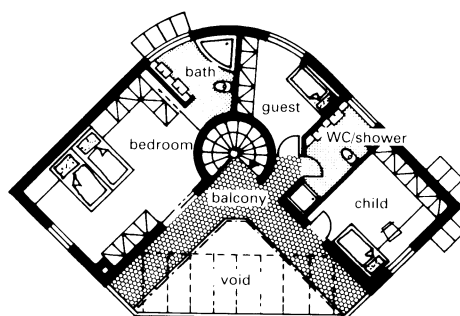
2 Upper floor



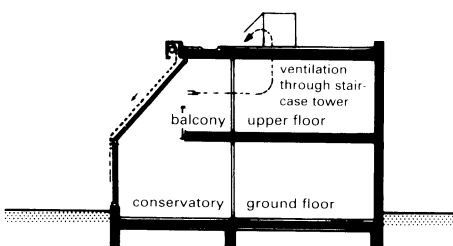
3 Section → 1 + 2 Architect: Hellwig



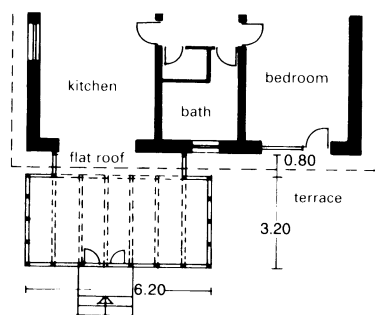
4 Ground floor → 5 + 6



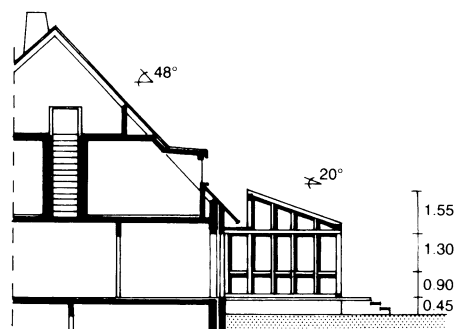
5 Upper floor



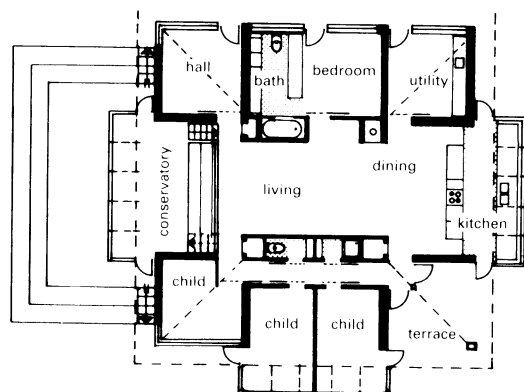
6 Section → 4 + 5



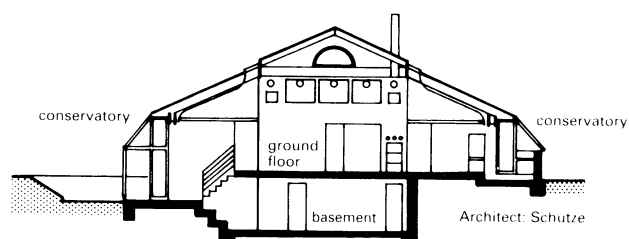
7 Conservatory with flat roof connection



8 Section → 7 Architect: Gundogan

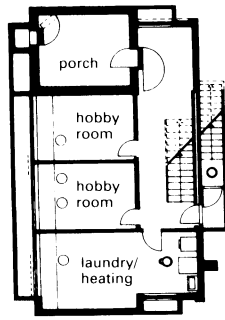


9 Ground floor: conservatory illuminates ground and basement → 10

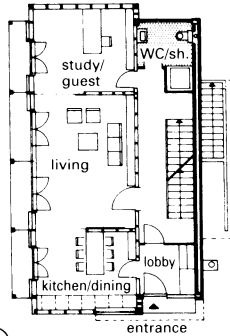


10 Section → 9 Architect: Schütze

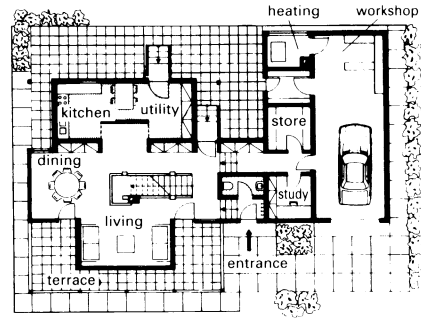
THREE-LEVEL HOUSES



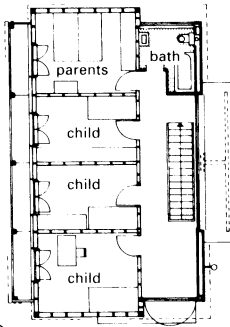
① Basement → ② - ④



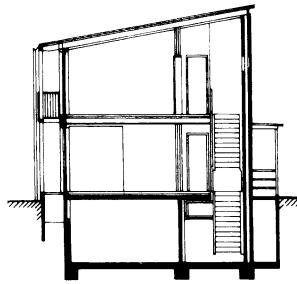
② Ground floor



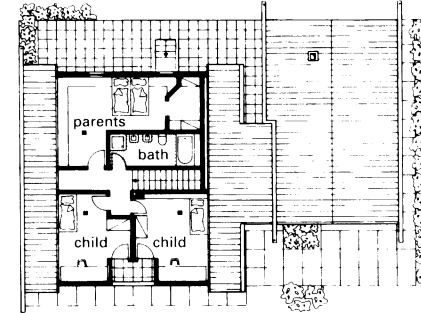
⑩ Ground floor with garage



③ Upper floor

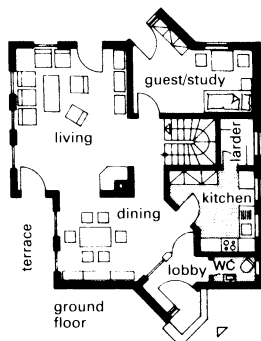


④ Section

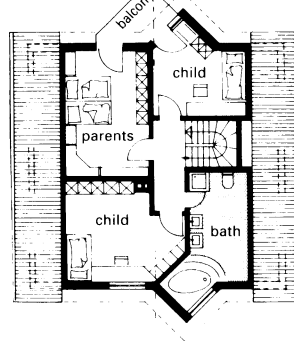


⑪ Upper floor → ⑩

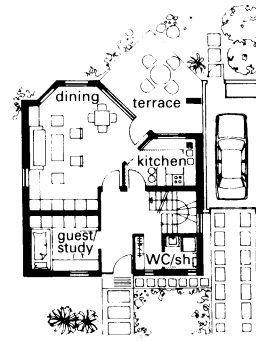
Architect: Luckmann



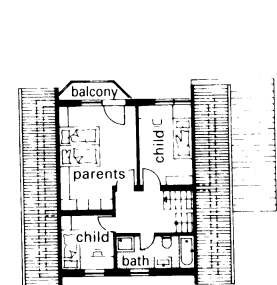
⑤ House with rooms in roof space



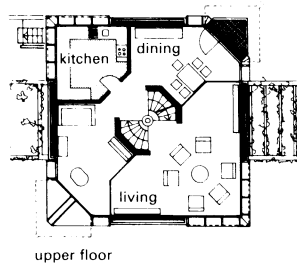
⑥ Upper floor → ⑤



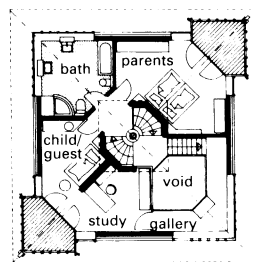
⑫ House with rooms in roof space



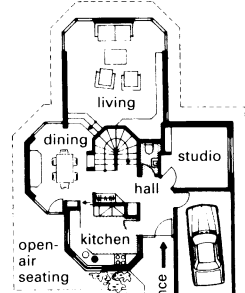
⑬ Upper floor → ⑫



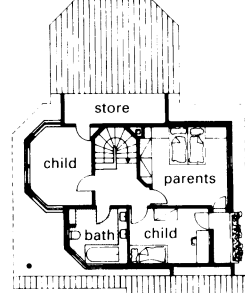
⑦ Living on three floors



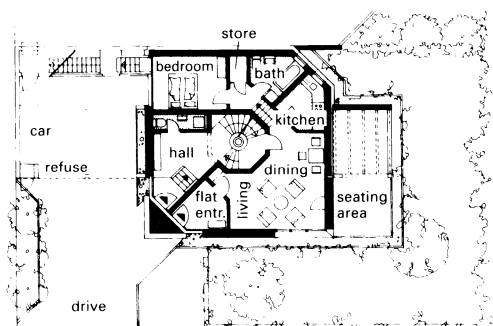
⑧ Roof space → ⑦



⑭ Ground floor

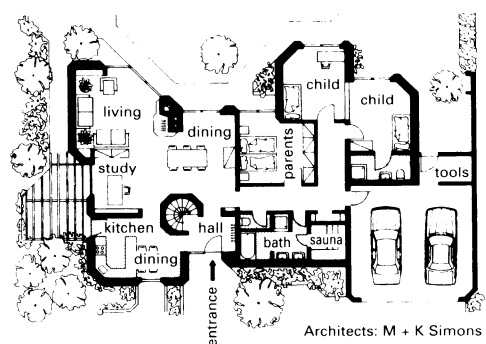


⑮ Upper floor → ⑭



⑨ Ground floor with self-contained flat → ⑦ + ⑧

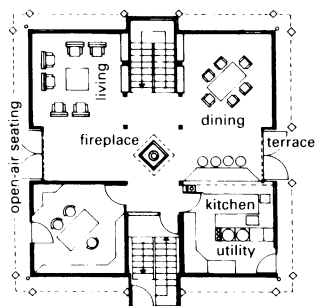
Architect: B. Rosewich



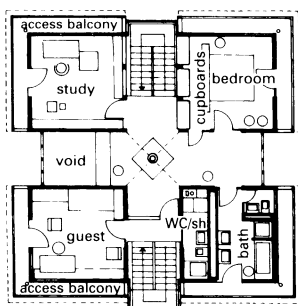
⑯ Barrier-free living

Architects: M + K Simons

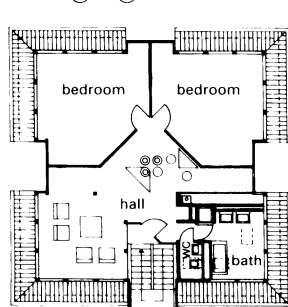
SQUARE, CUBIC AND TENT-SHAPE FORMS



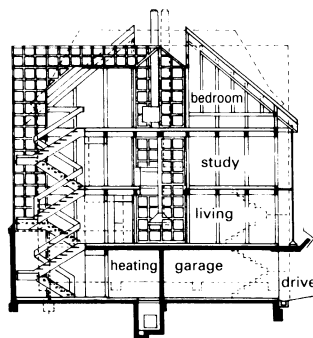
① Ground floor: square house
→ ② - ④



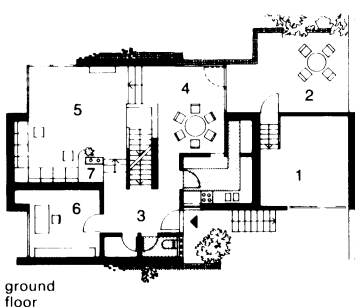
② Upper floor
Architect: Brixel



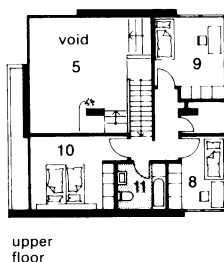
③ Attic floor



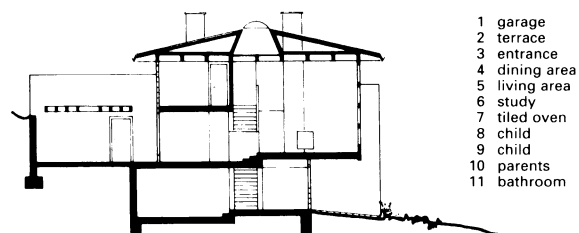
④ Section



⑤ House on a slope → ⑥



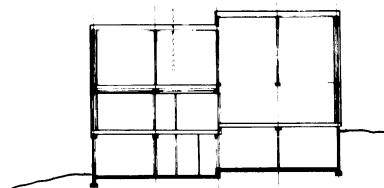
upper floor



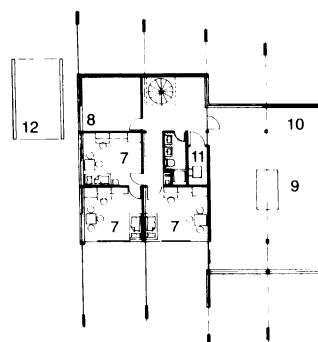
⑥ Section → ⑤

Architect: J. Strelci

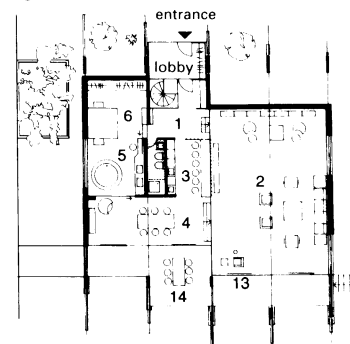
⑦ Section → ⑧ - ⑩



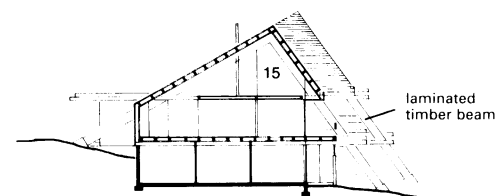
⑧ Lower ground floor



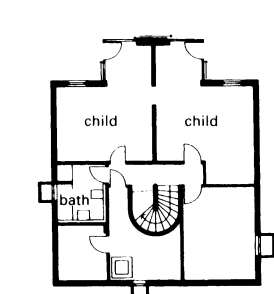
⑨ Ground floor



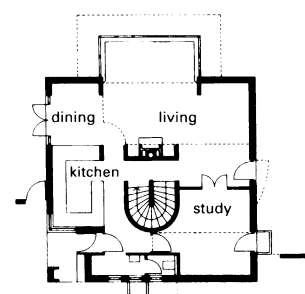
⑩ Tent house, timber construction: section → ⑦ - ⑨



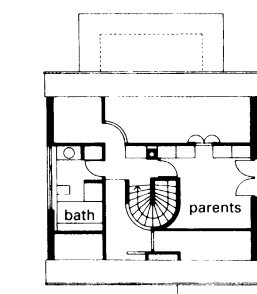
Architect: J. Romberger



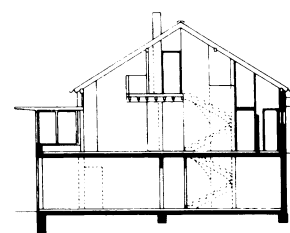
⑪ Basement → ⑫ - ⑭



⑫ Ground floor



⑬ Upper floor



Architect: Lederer

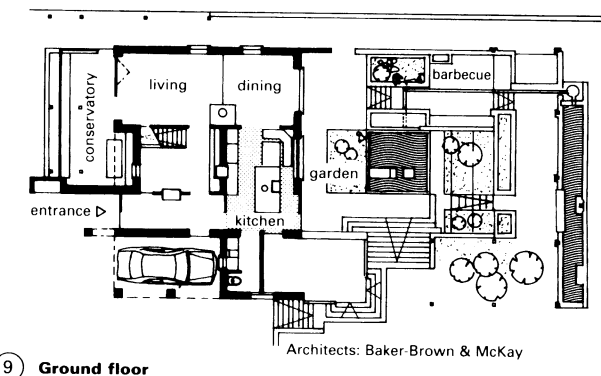
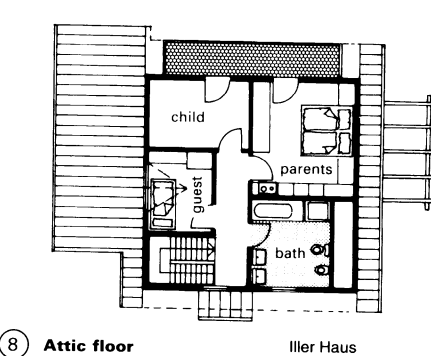
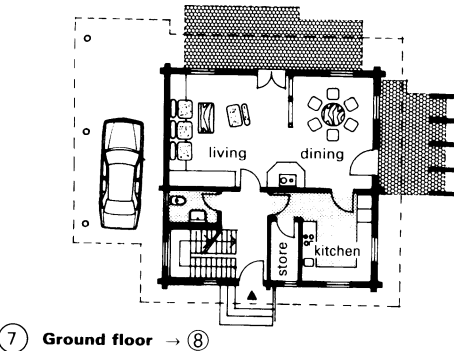
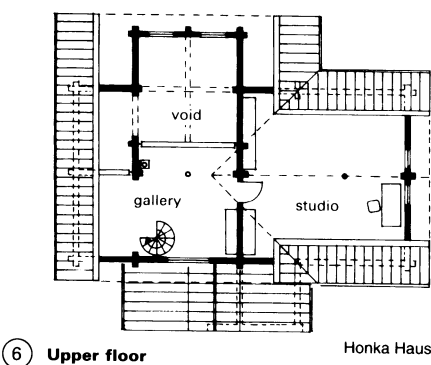
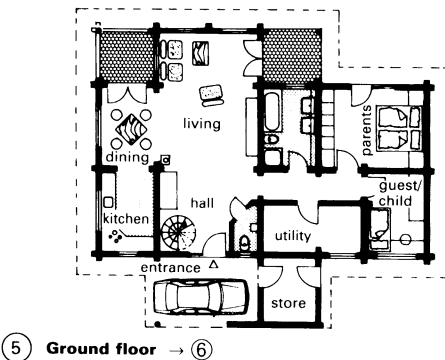
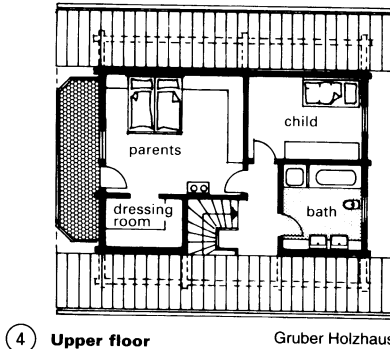
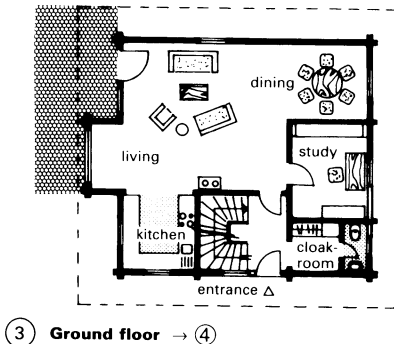
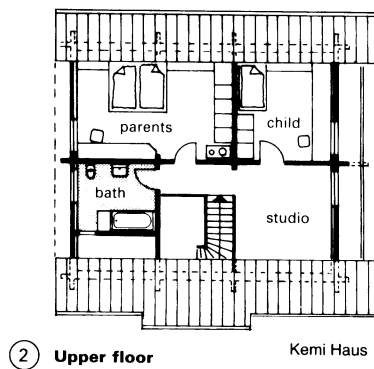
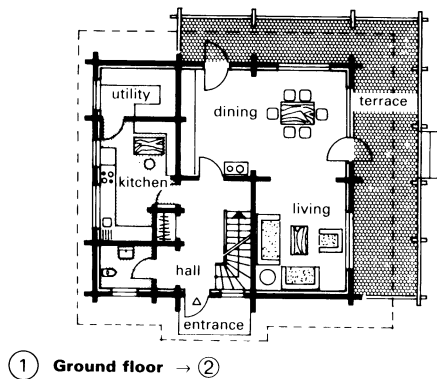
⑭ Section

ECOLOGICAL BUILDING

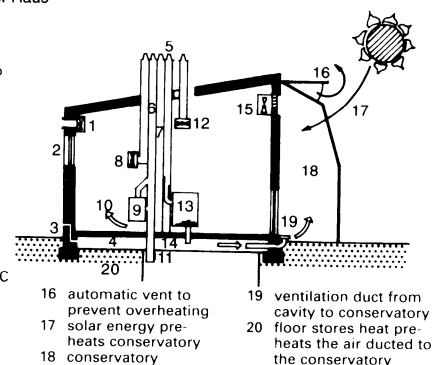
The timber house is the epitome of natural, traditional and healthy living. This form of construction conforms to many clients' ecological, biological and, not least, economical, requirements. It uses selected solid timbers, natural insulation materials (e.g. cotton, wool or cork), natural materials for the roofing (e.g. clay tiles), and plant-based paints for decoration, all leading to a high standard of eco-friendliness.

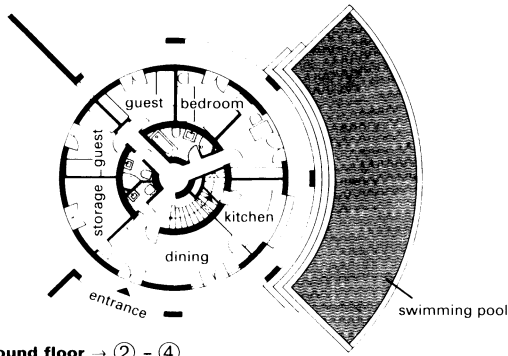
Usually, only the slow growing timbers from northern countries are used for this type of construction. Unlimited life and low maintenance are the rule: for example, red cedar, as it is commonly known, contains a tannin which acts as a natural wood preservative, making impregnation unnecessary. Deeply overhanging roofs are used to shelter the façades. Manufacturers offer several types of external wall construction. Double-block construction consists usually of two identical leaves containing an insulation layer between. Single-leaf log walls produce the typical traditional atmosphere of the log cabin. The purchaser has the choice of round logs or squared blocks.

Many timber houses can be freely planned to meet the client's requirements. The client also has a choice of which type of timber to use (spruce, larch, cedar). Many suppliers offer self-build options together with assistance from the firm's construction specialists.

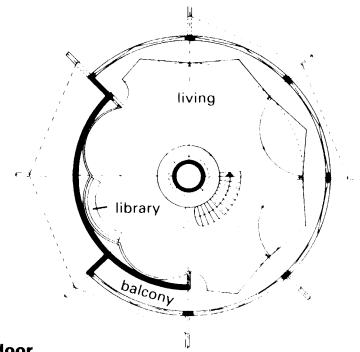


- 1 bathroom extractor
- 2 ventilation/windows
- 3 stepped ventilation to under-floor cavity
- 4 cavity
- 5 solid-fuel heater flue
- 6 boiler flue
- 7 air intake to heating
- 8 kitchen extractor
- 9 boiler
- 10 air supply
- 11 solid-fuel heater flue taken down to floor level for cleaning access
- 12 extractor, bath and WC
- 13 solid-fuel heater
- 14 air supply to open windows
- 15 fresh air intake to house

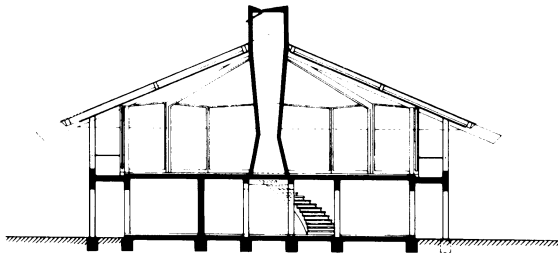




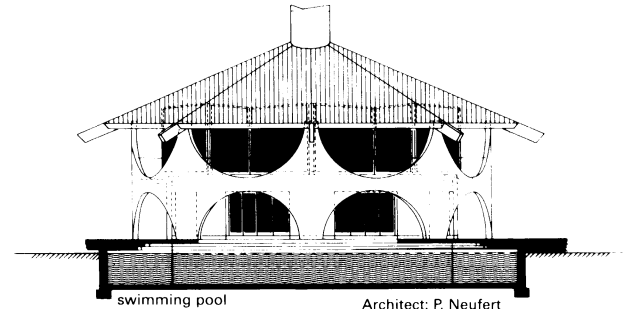
① Ground floor → ② - ④



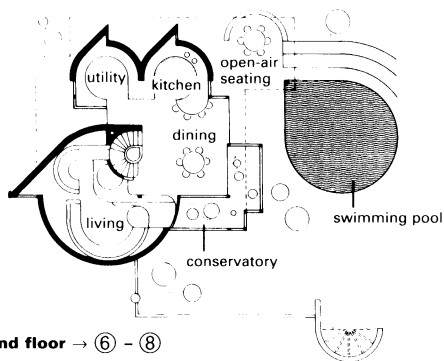
② Upper floor



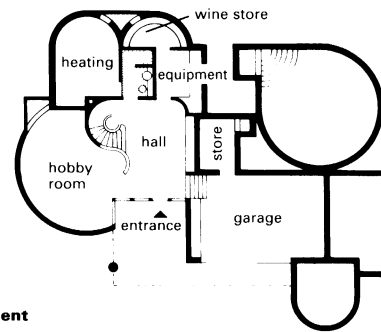
③ Section



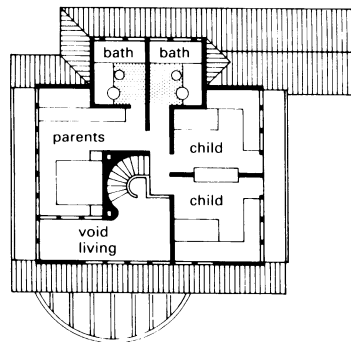
④ View from south and section through swimming pool



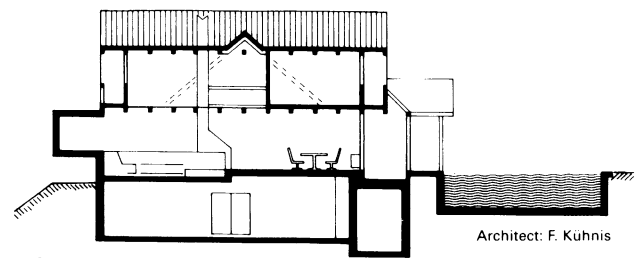
⑤ Ground floor → ⑥ - ⑧



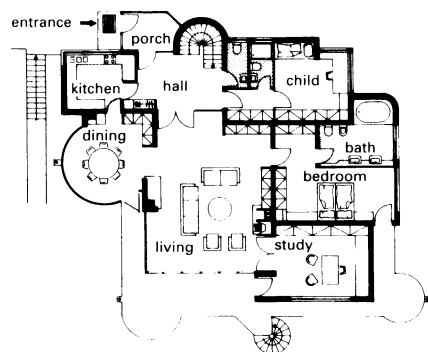
⑥ Basement



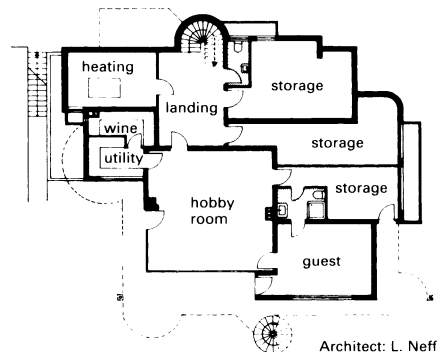
⑦ Upper floor



⑧ Section



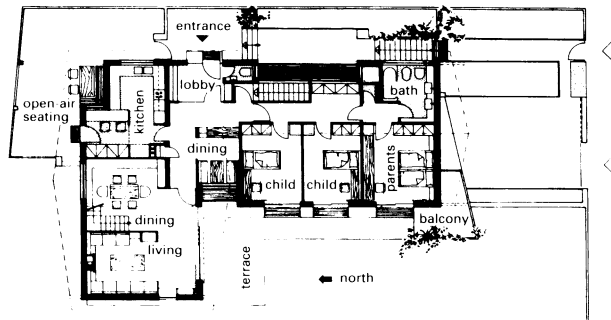
⑨ Ground floor



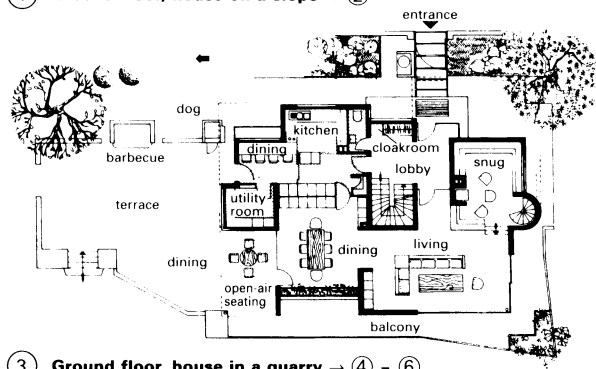
⑩ Lower floor

Architect: L. Neff

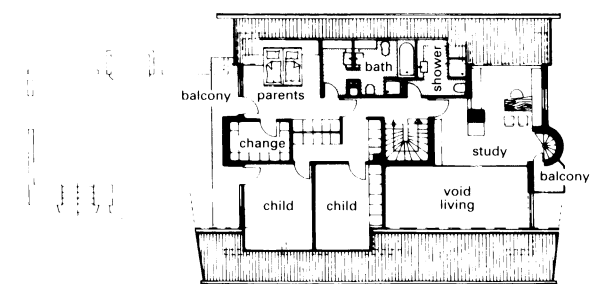
HOUSE TYPES: EXAMPLES



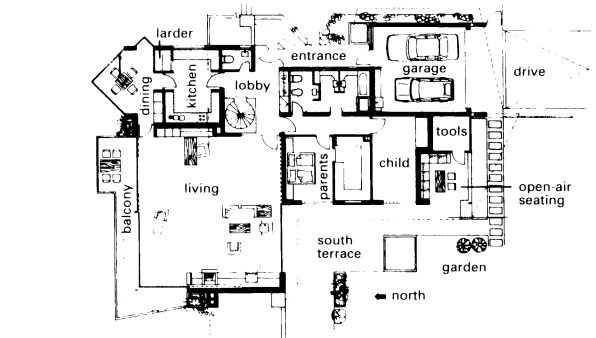
① Ground floor, house on a slope → ②



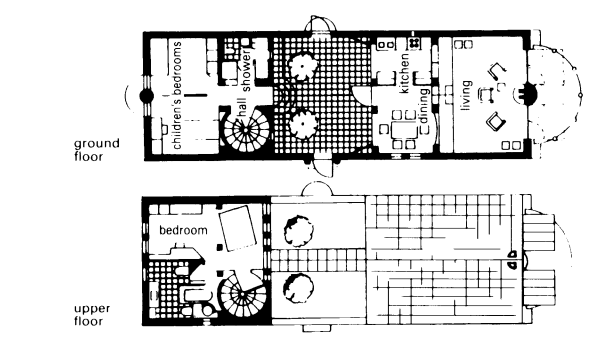
③ Ground floor, house in a quarry → ④ - ⑥



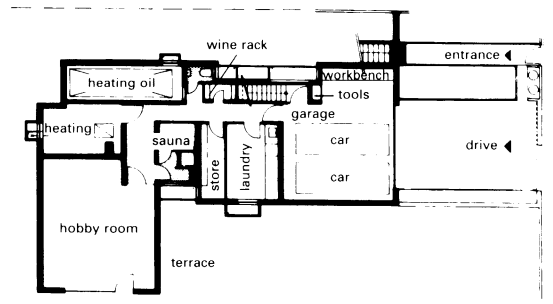
⑤ Top floor



⑦ Ground floor, house on a north slope → ⑧

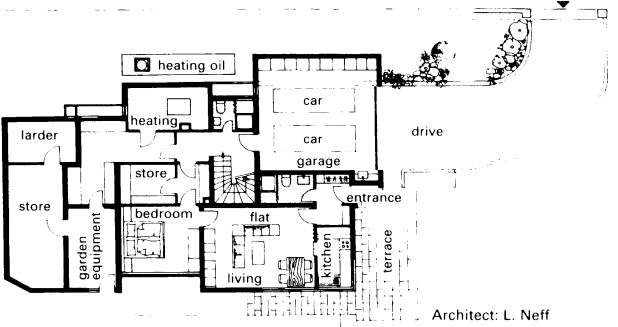


⑨ Ground and upper floors → ⑩



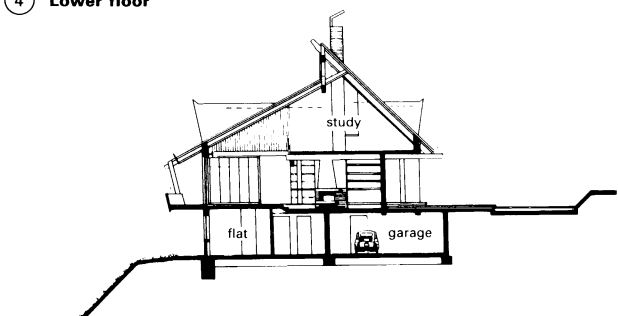
② Lower floor

Architect: L. Neff

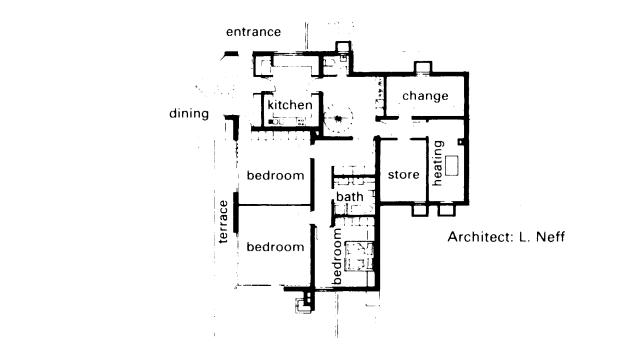


④ Lower floor

Architect: L. Neff

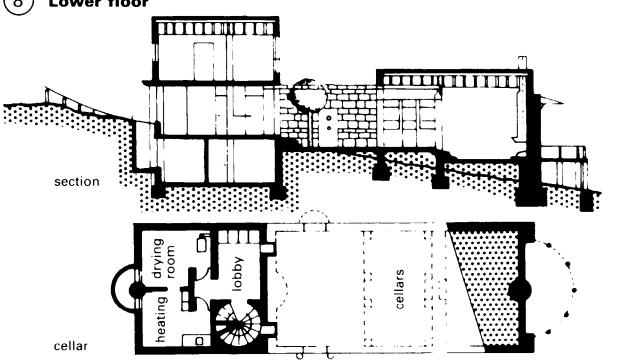


⑥ Section



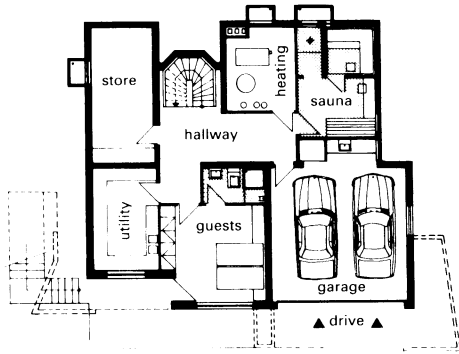
⑧ Lower floor

Architect: L. Neff

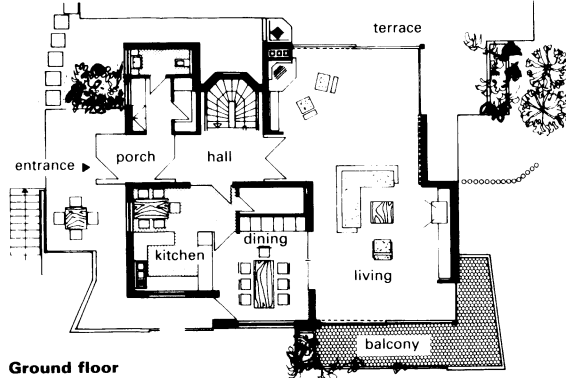


⑩ Section and cellar

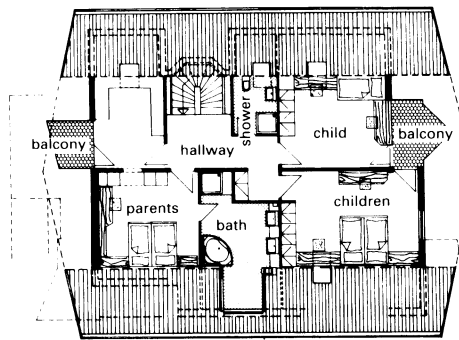
Architect: V.D. Valentyn



① Basement, house on a north slope → ② + ③

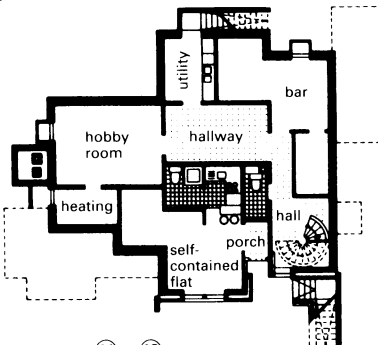


② Ground floor

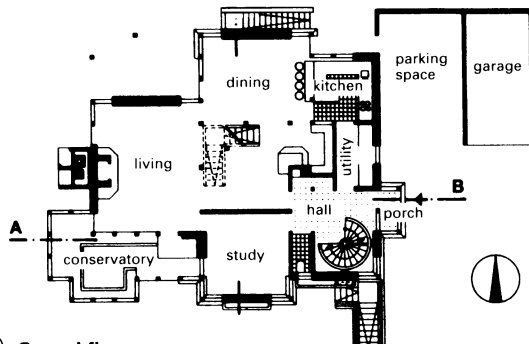


③ Upper floor

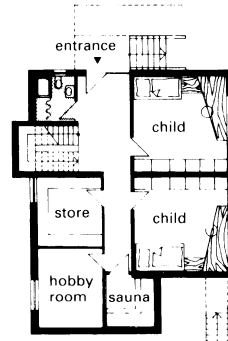
Architect: L. Neff



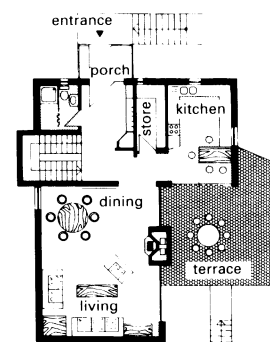
⑩ Basement → ⑪ - ⑬



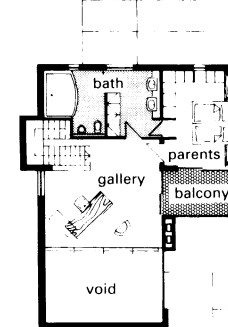
⑫ Ground floor



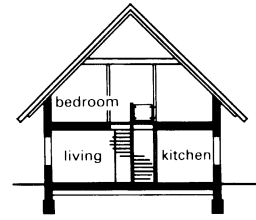
④ Basement → ⑤ + ⑥



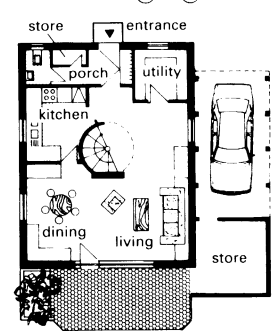
⑤ Ground floor



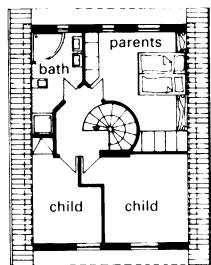
⑥ Upper floor



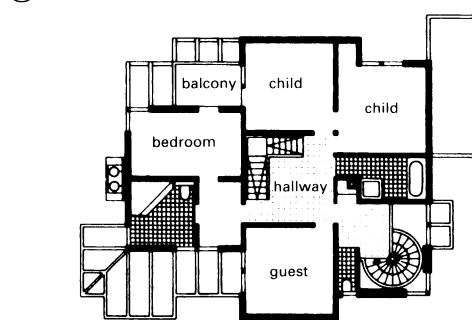
⑦ Section, small house without basement → ⑧ + ⑨



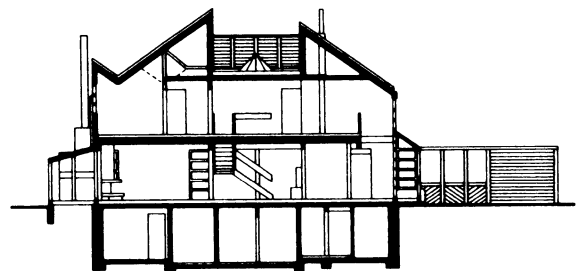
⑧ Ground floor



⑨ Upper floor

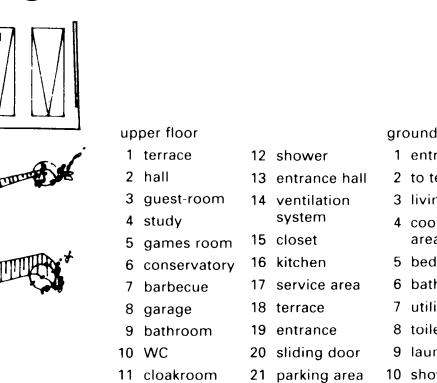
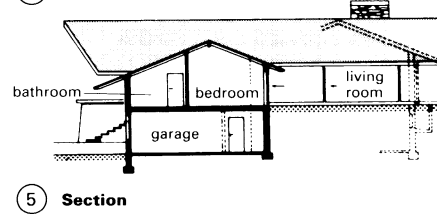
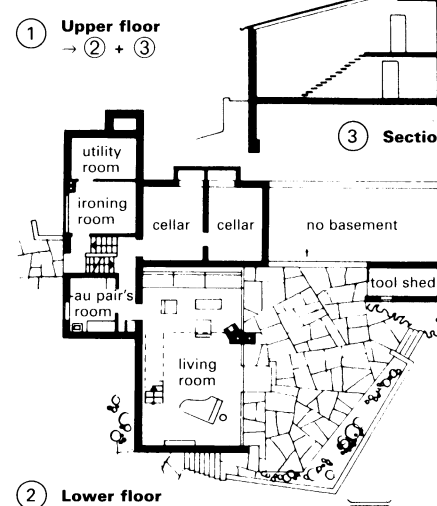
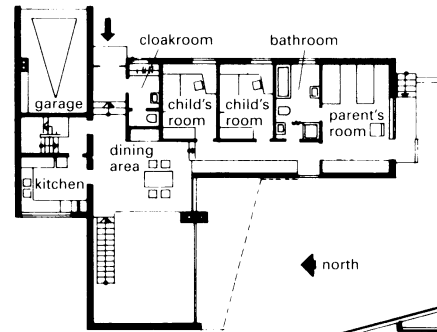
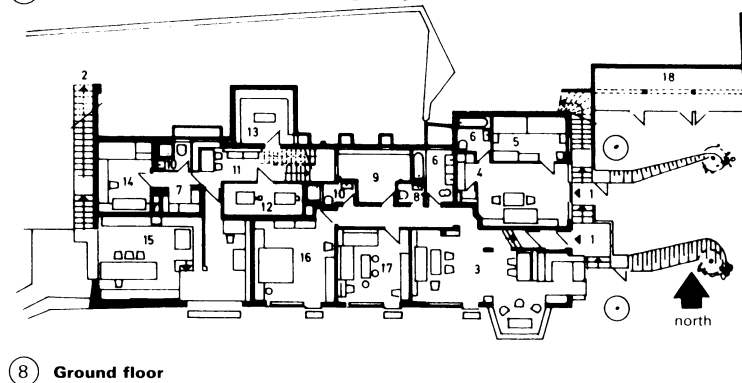
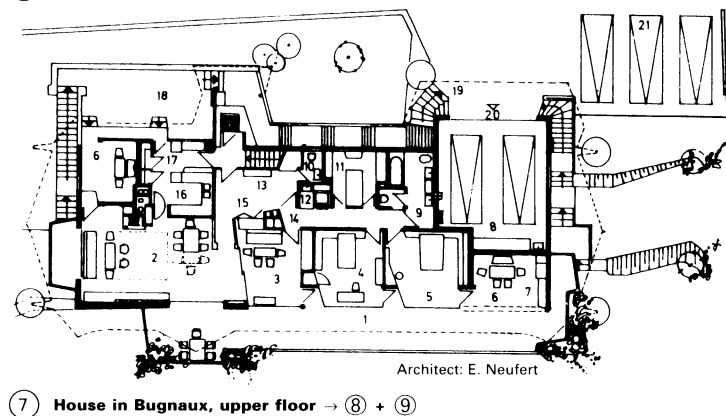
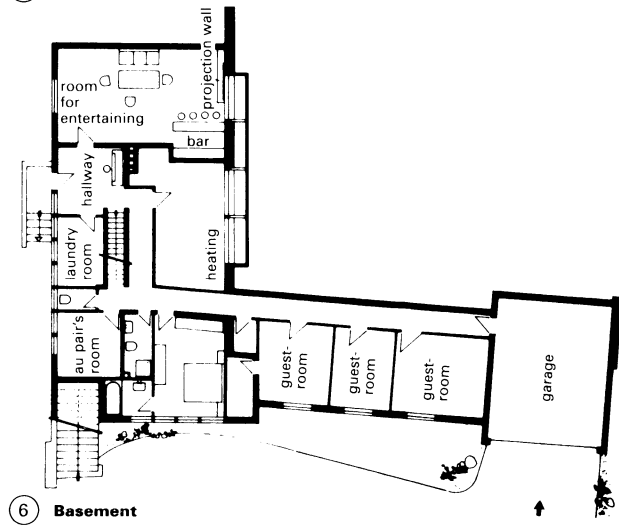
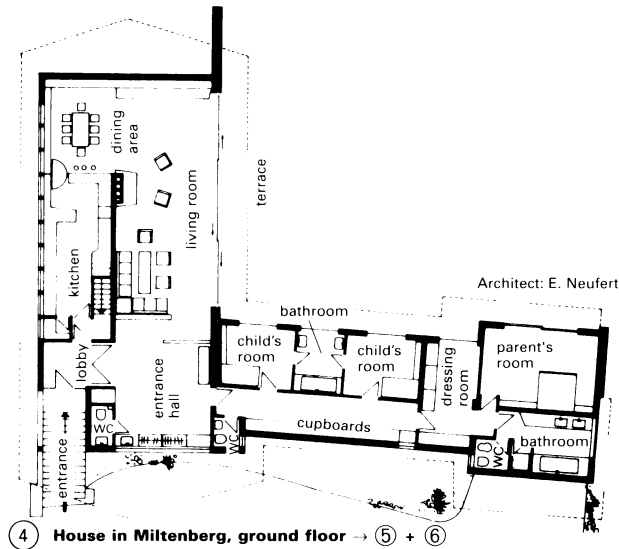


⑪ Top floor

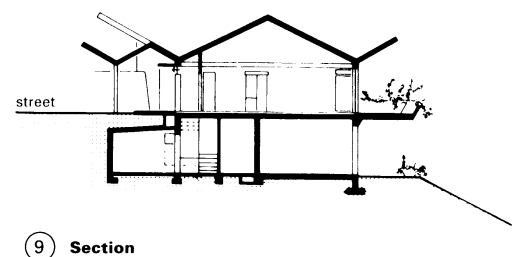


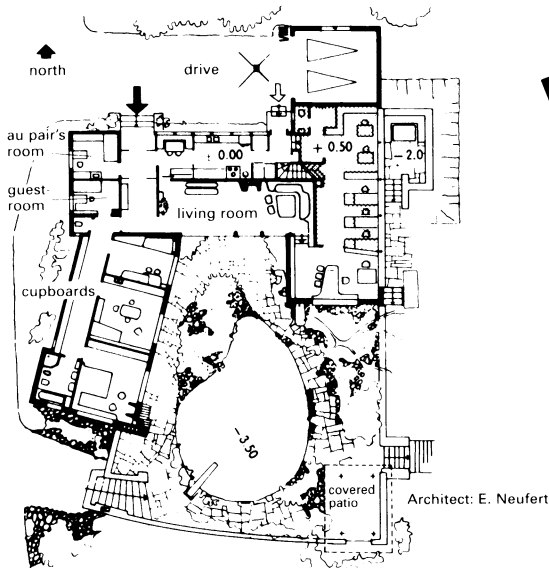
⑬ Section

Architects: Kaplan and Könnemund



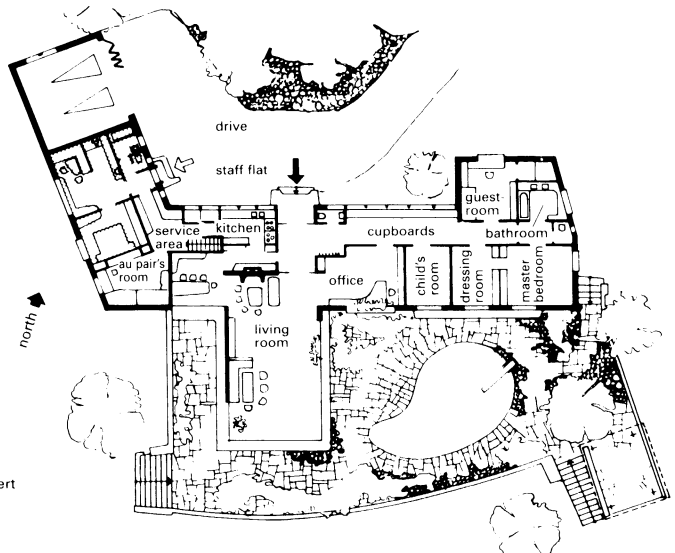
upper floor		ground floor	
1 terrace	12 shower	1 entrance	11 dining area
2 hall	13 entrance hall	2 to terrace	12 boiler-room
3 guest-room	14 ventilation system	3 living area	13 cellar
4 study	15 closet	4 cooking area	14 au pair's room
5 games room	16 kitchen	5 bedroom	15 studio
6 conservatory	17 service area	6 bathroom	16 parent's bedroom
7 barbecue	18 terrace	7 utility room	17 children's bedroom
8 garage	19 entrance	8 toilet	18 wood shed
9 bathroom	20 sliding door	9 laundry	
10 WC	21 parking area	10 shower	
11 cloakroom			





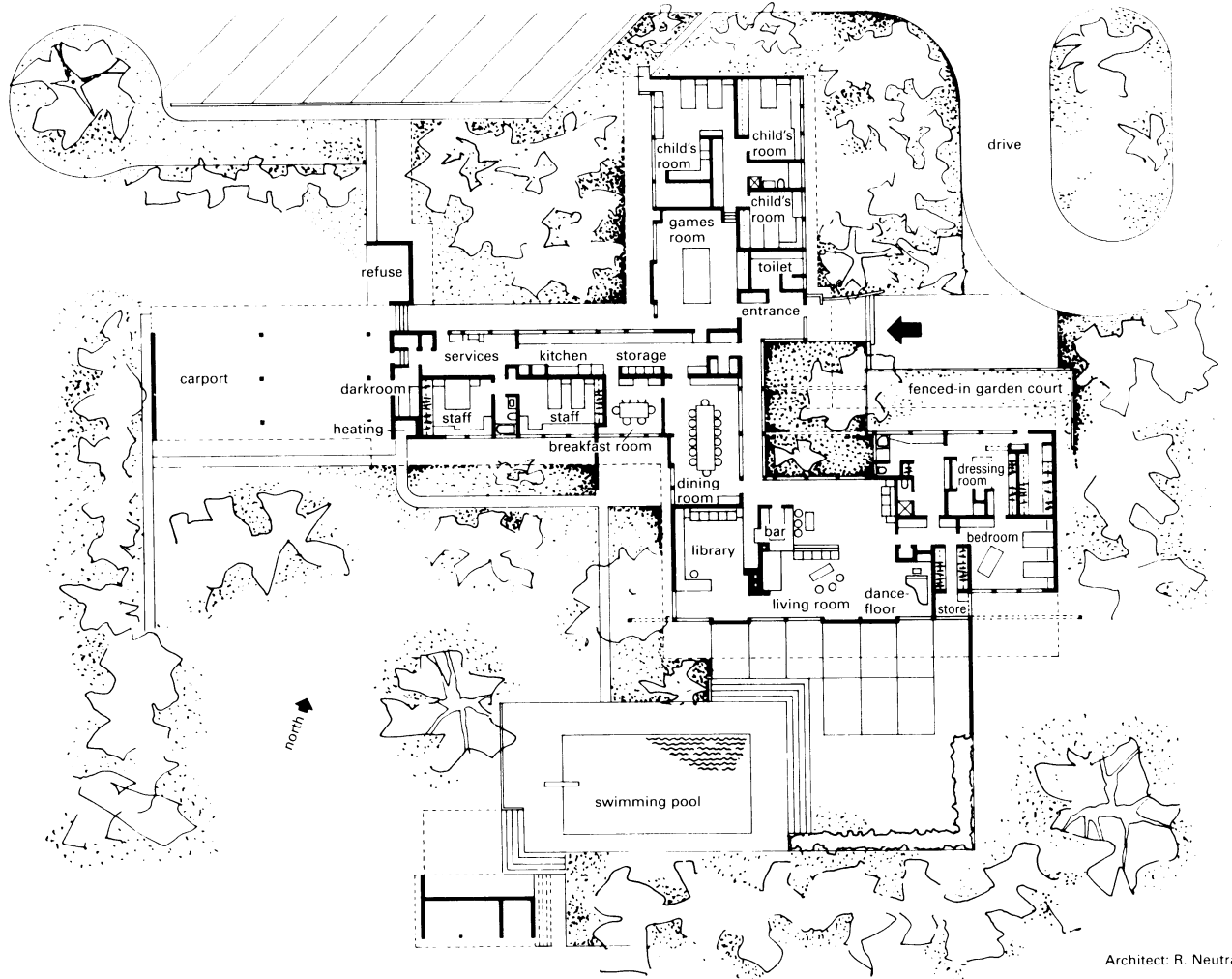
studio and service rooms are near the side entrance, with the office between studio and living room;
further draughting rooms with north light are situated above the kitchen;
the bedrooms are on the east side, sheltering the residential area (located to the north) from the wind and preserving the view;
the covered outdoor patio gets western sun

① Architect's house: scale 1:500



Architect: E. Neufert

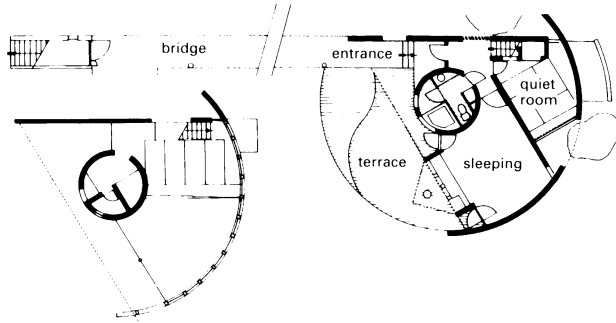
② Single-storey house with separate accommodation (chauffeur): scale 1:500



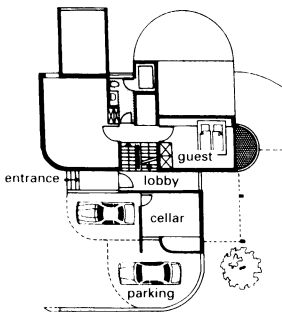
Architect: R. Neutra

③ House in Beverly Hills, California: scale 1:500

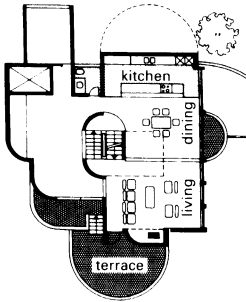
INTERNATIONAL EXAMPLES



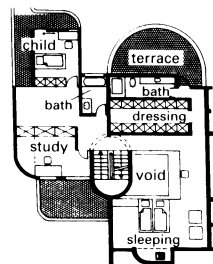
① Second floor and ground floor → ②



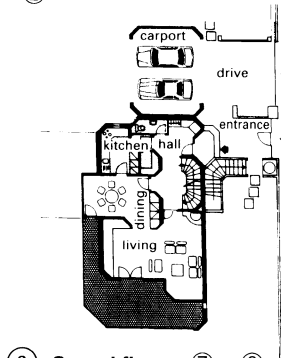
③ Ground floor, house in California → ④ + ⑤



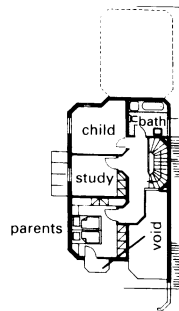
④ First floor



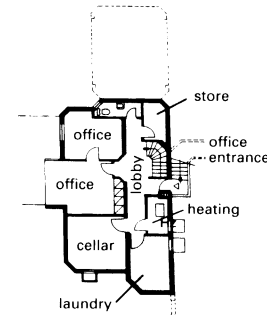
⑤ Second floor
Architect: R. Kappe, Los Angeles



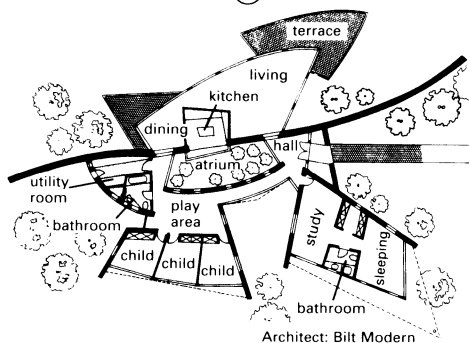
⑥ Ground floor → ⑦ + ⑧



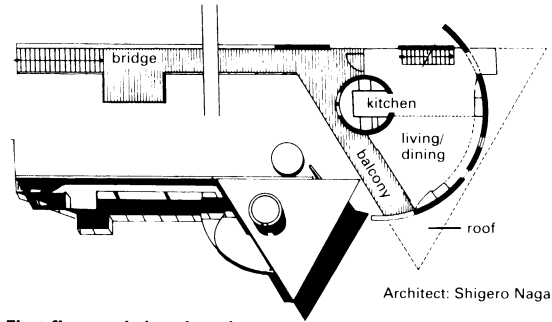
⑦ Upper floor



⑧ Basement
Architect: L. Neff

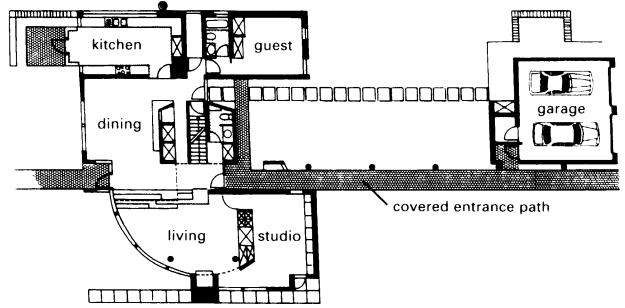


⑨ One storey house in Victoria, Australia
Architect: Bilt Modern

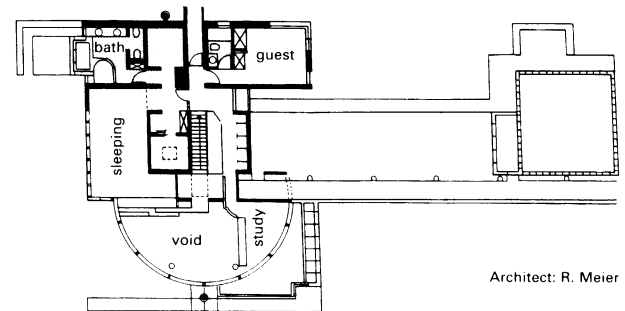


Architect: Shigero Nagano

② First floor and situation plan

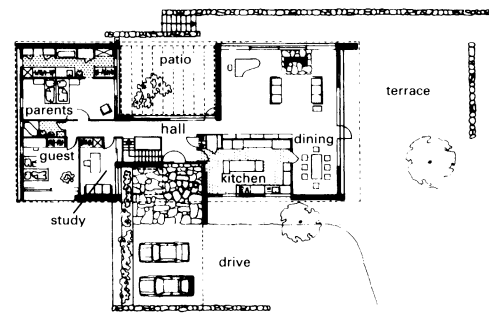


⑩ Ground floor, house in the USA → ⑪

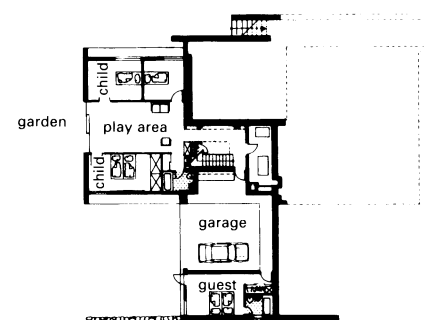


Architect: R. Meier

⑪ Upper floor

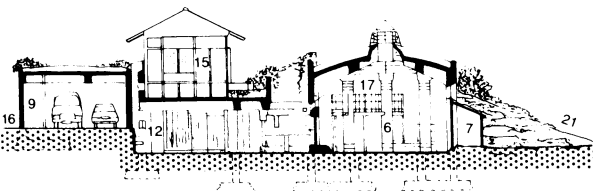
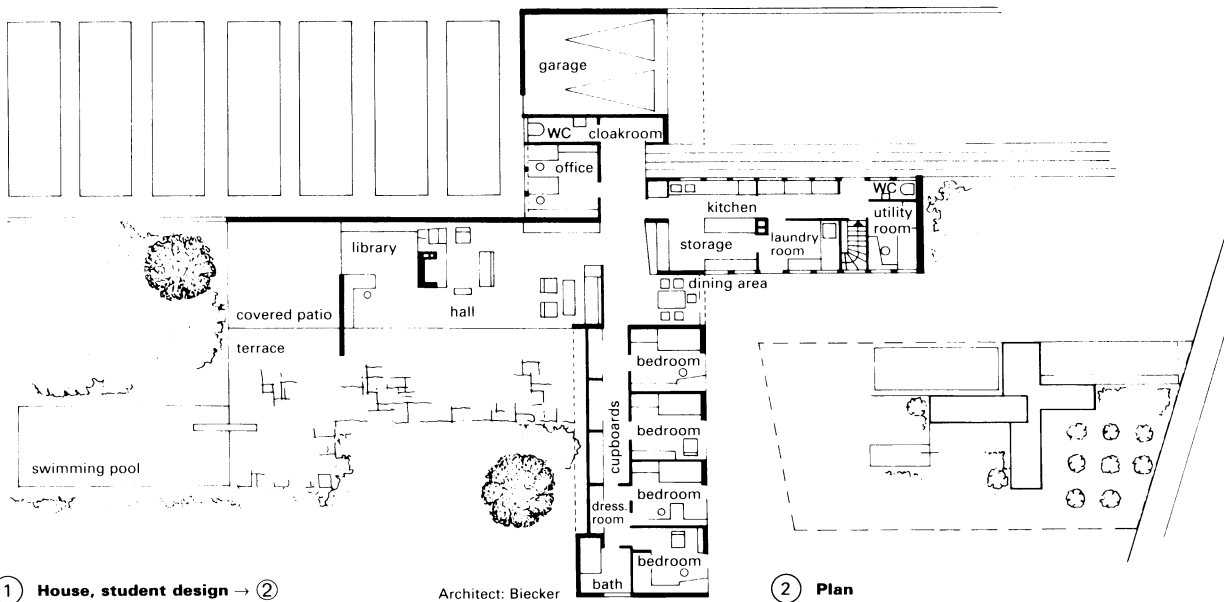


⑫ Ground floor, house in the USA → ⑬

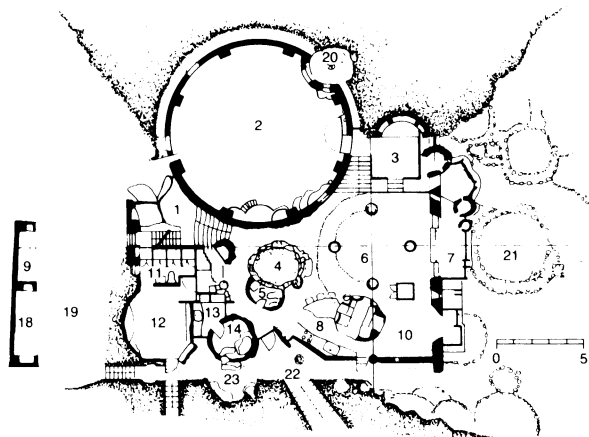


Architect: M. Breuer

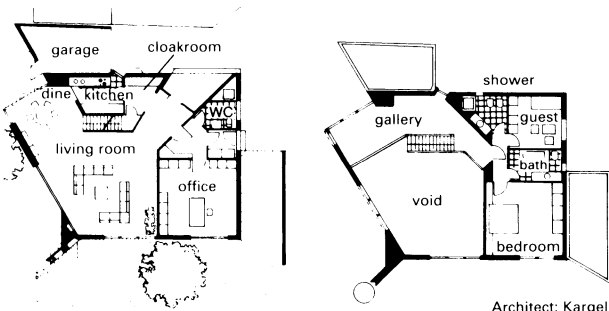
⑬ Lower floor



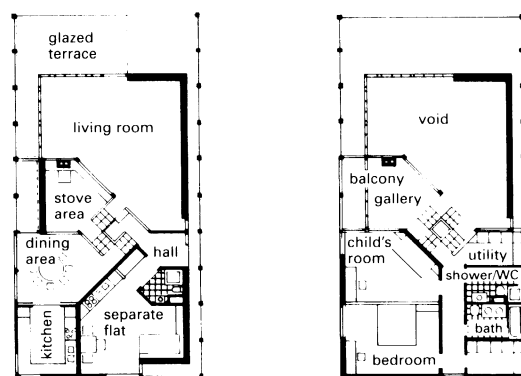
- | | | | |
|----------------|-------------------------|-----------------|--------------------|
| 1 entrance | 7 conservatory | 13 laundry room | 19 garage |
| 2 rock garden | 8 kitchen | 14 bath | 20 light well |
| 3 study | 9 storage | 15 tatami room | 21 heavenly garden |
| 4 patio garden | 10 children's play area | 16 street | 22 side entrance |
| 5 toilet | 11 cloakroom | 17 gallery | 23 shaft |
| 6 seating area | 12 bedroom | 18 machine room | |



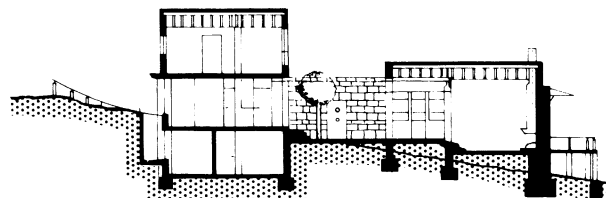
④ House in Japan Architect: Atelier ZO



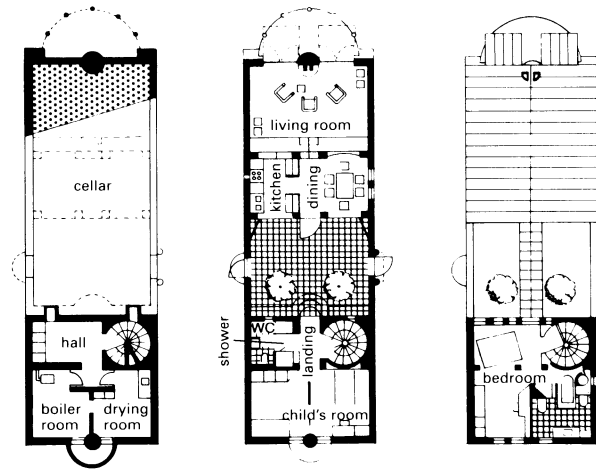
⑤ Ground floor → ⑥ Architect: Kargel



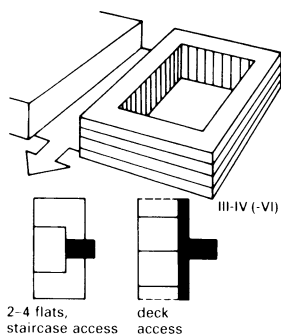
⑦ Ground floor → ⑧ Architects: Otto Steidle & Hans Kohl



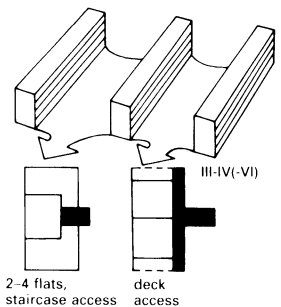
⑨ Section → ⑩ - ⑫ Architect: V.D. Valentyn



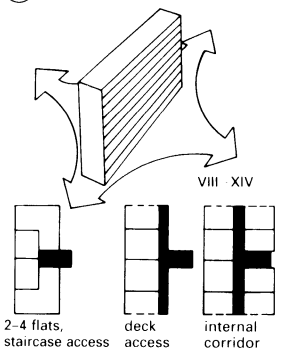
⑩ Cellar ⑪ Ground floor ⑫ Upper floor



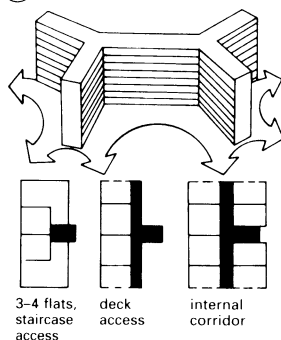
1 Blocks



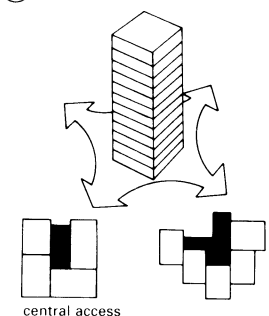
2 Linear arrangement



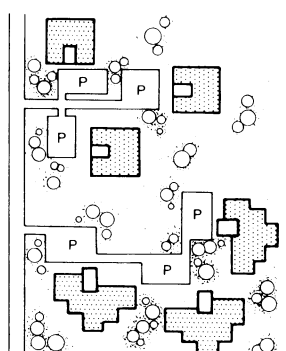
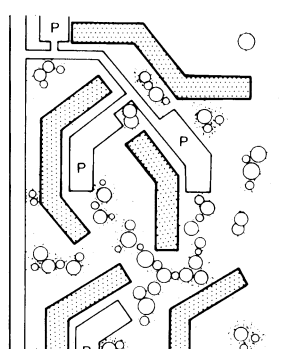
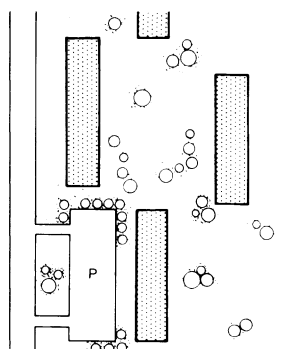
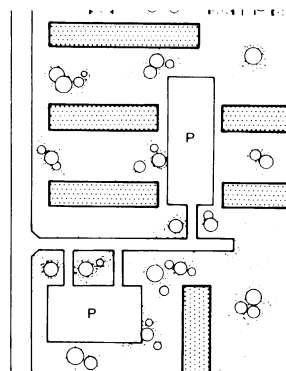
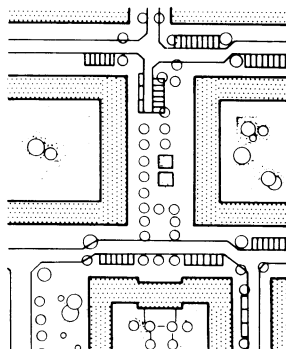
3 Slab-blocks



4 Large-scale developments



5 Point-blocks



MULTISTOREY HOUSING

(1) Blocks

A compact, layered building form (either single buildings or in groups) that gives high occupancy densities. The external spaces within and around the building are clearly differentiated in relation to form and function.

(2) Linear arrangement

A spacious building configuration: either groups of identical block types or of buildings of completely different designs. There is little or no differentiation of the external spaces around the buildings.

(3) Slab-blocks

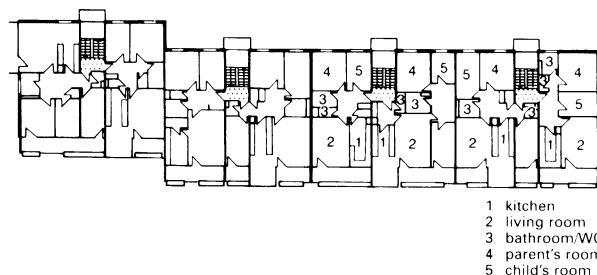
This building form is often used in an isolated configuration. It can be extended both in length and height but allows little scope for variety among the room layouts. Differentiation of the surrounding areas is difficult.

(4) Large-scale developments

By expanding and interconnecting slab buildings to create large forms stretching out over a wide area it is possible to develop large tracts. Differentiation between spaces defined by the buildings is almost impossible to achieve.

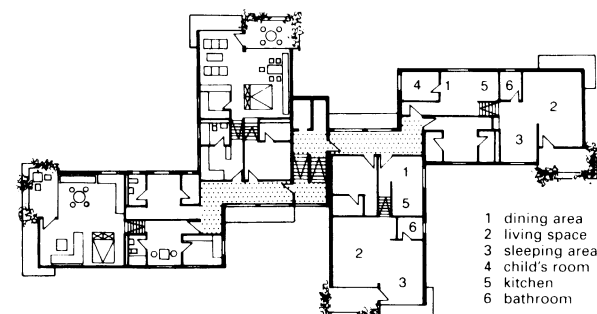
(5) Point-blocks

These are distinctive individual buildings, often standing isolated in open spaces. A 'dominant element' in town planning, this building type is frequently designed in combination with low-rise developments.

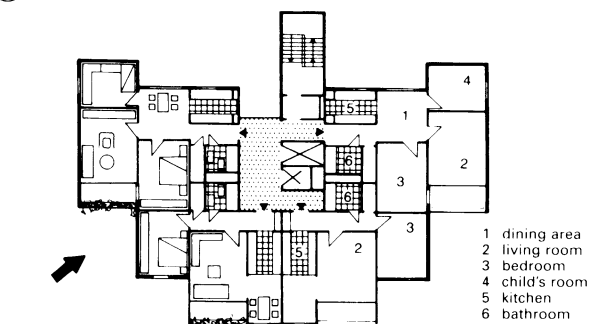


6 Building layout in Augsburg

Architect: E.C. Müller

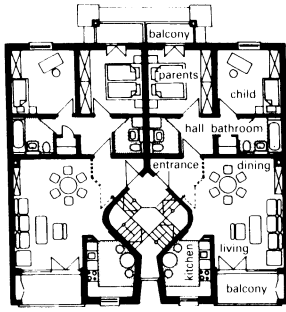


7 Flats off a corridor

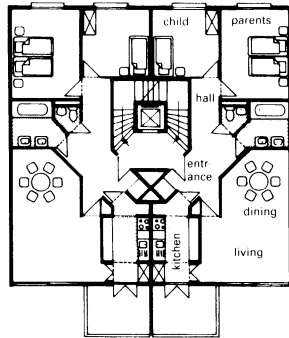


8 Plan of building with four flats per floor and staircase access

Architect: Pogadi

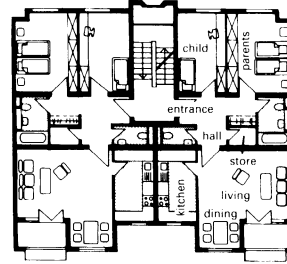


① Two dwellings per floor, staircase on outside wall



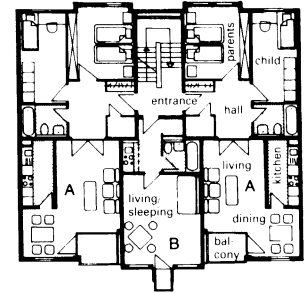
Architect: Diener

② Two dwellings per floor, internal staircase



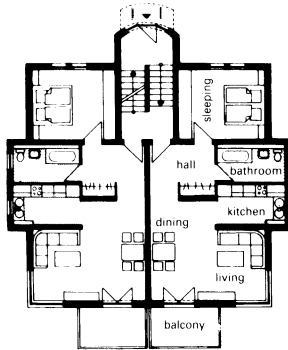
Architects: HPP and LKT

③ Two dwellings per floor

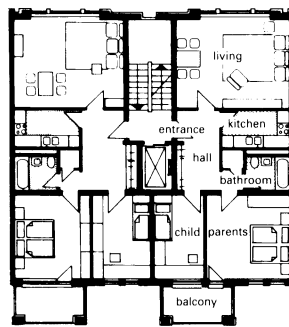


Architects: HPP

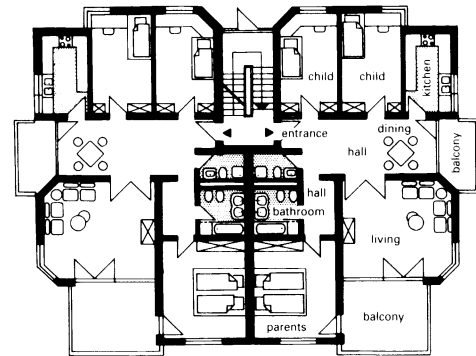
④ Three dwellings per floor: 2 apartments and one studio flat



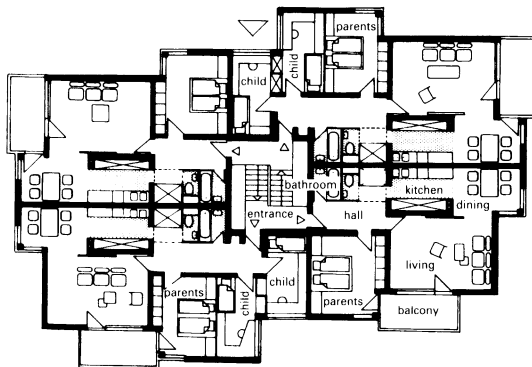
⑤ Two 60 m² apartments per floor



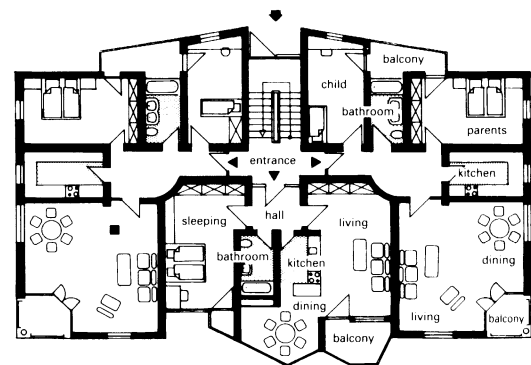
⑥ Two dwellings per floor with lift



⑦ Two dwellings per floor

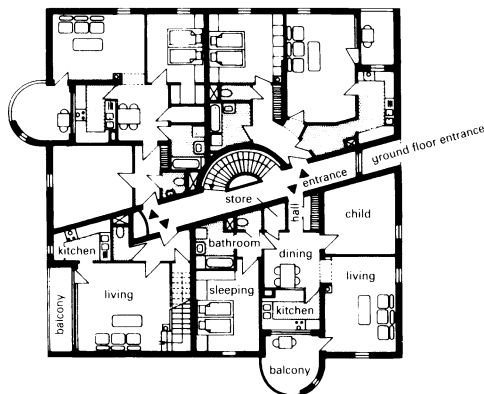


⑧ Four dwellings per floor: two two-room apartments, two four-room apartments



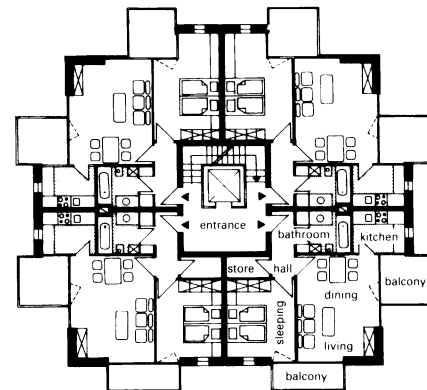
⑨ Three dwellings per floor

Architect: L. Neff



⑩ Four dwellings per floor

Architect: Peichl



⑪ Four dwellings per floor

Architect: Neufert/Meitmann/Graf

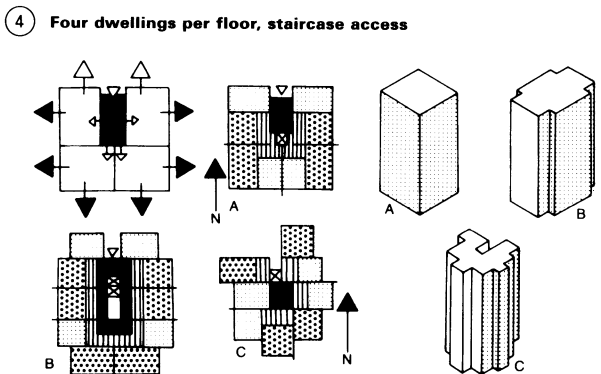
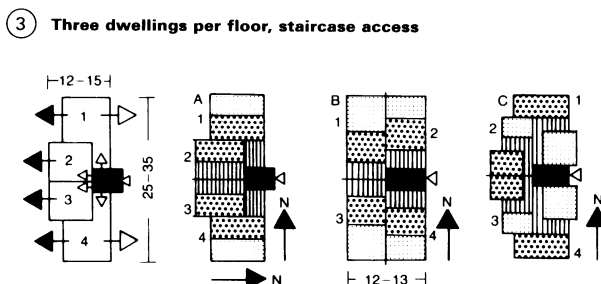
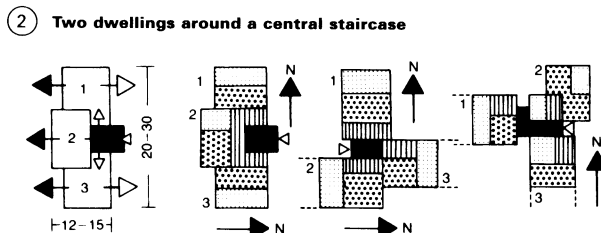
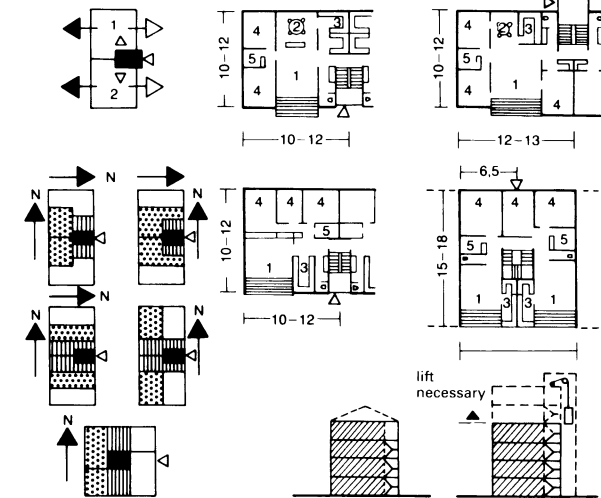
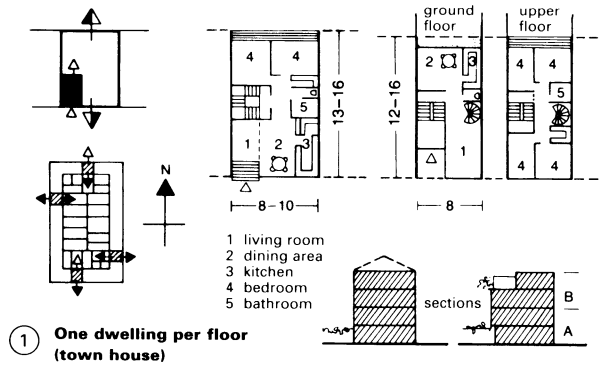
MULTISTOREY HOUSING

Developments with only one dwelling per floor → ① (the basic form for town houses) are often uneconomical. Four-storey buildings without lifts are the usual form.

Housing with two dwellings per floor around a central core → ② provides a good balance between living quality and economy, allowing a variety of plans with satisfactory solar orientation and flats with different numbers of rooms. Buildings up to four storeys can have stairs only whereas those with five or more require a lift. For flats over a height of 22 m, high-rise building conditions apply.

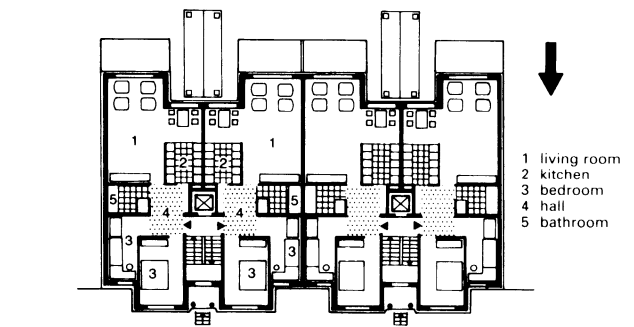
Having three dwellings per floor and a central staircase → ③ again offers a good mix of economy and living quality, and this form is suitable for building corner units. Two-, three- and four-roomed dwellings can be considered. Housing with four dwellings per floor and a shared staircase → ④ requires appropriate planning to provide a satisfactory relationship between economy and living quality. Different types of flat on each floor are possible.

With point-blocks → ⑤ the three-dimensional design is determined by the plan form.

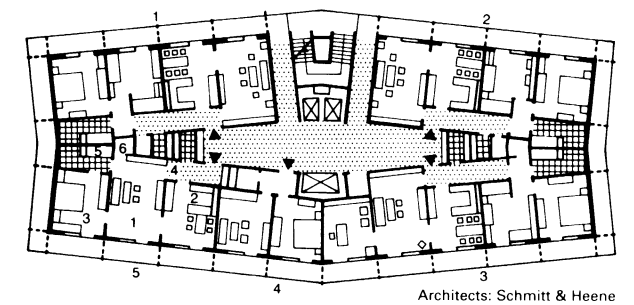


⑤ Point-block

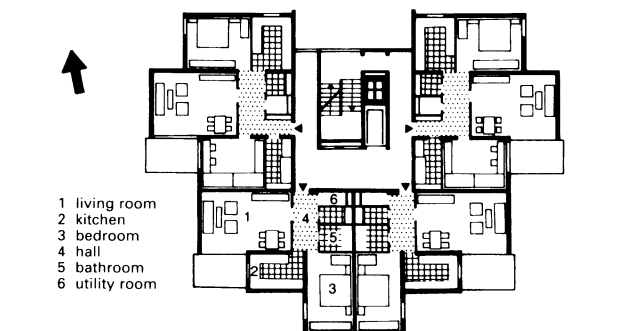
key:
 living area
 sleeping area
 other rooms
 entrance
 main orientation
 secondary orientation



⑥ Plan of → ② Architect: W. Dorink



⑦ Standard floor with five residential units Architects: Schmitt & Heene



⑧ High-rise block of flats Architect: W. Iron

BALCONIES

Balconies offer an effective means of improving the attractiveness of domestic accommodation units. They also give an extended work space as well as an easily supervised outdoor children's play area. Typical uses include relaxation, sunbathing, sleeping, reading, eating etc.

In addition to the required functional living space an area for plant boxes should be provided wherever possible → ⑧ + ⑭.

Corner balconies → ① offer privacy and good shelter and are therefore preferable to open balconies. Open balconies require a protective screen on the side facing the prevailing wind → ②.

Where there are groups of balconies (as in blocks of flats), screens should be used to ensure privacy and give shelter from the wind → ③. Even better is to separate the balconies with part of the structure because this makes it possible to include some storage space (e.g. for balcony furniture, sunshade etc.) → ④ + ⑫.

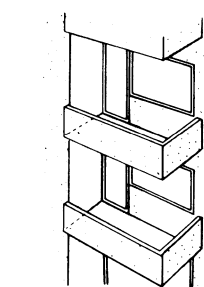
Loggias are justifiable in hot climates but are inappropriate in cooler countries. They only get the sunshine for a short time and cause an increase in the external wall areas of the adjacent rooms, which increases heat loss → ⑤. Balconies which are offset in their elevation can make façades less severe but it is difficult to provide privacy and protection from the weather and sun → ⑥. Balconies which are offset in their plan layout on the other hand offer excellent privacy and shelter → ⑦.

During planning specify:

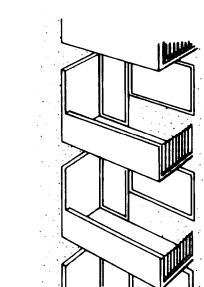
- good orientation in relation to the the path of the sun and the view;
- appropriate location with respect to neighbouring flats and houses;
- effective spatial location with respect to adjacent living rooms, studios or bedrooms;
- sufficient size, privacy, protection from noise and the weather (wind, rain and direct sunshine);
- suitable materials for parapets (e.g. opaque glass, plastic or wooden balusters within a frame).

The balcony frame is best made from light steel profiles or tubes with a good anchorage in the masonry. Balcony balusters made from vertical steel rods (note that horizontal rods can be climbed by children) can be considered but are not desirable because they do not offer shelter from the wind and lack privacy. Where they are used, they are often covered by the tenants themselves with all sorts of different materials.

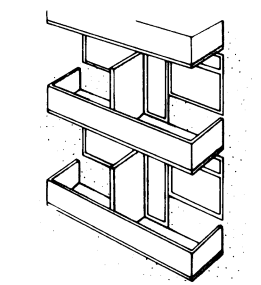
Draughts can occur in the intermediate spaces between parapets and the concrete slab → ⑧, so it is better to extend the parapet down in front of the balcony slab or to have a solid parapet. This must be kept low to avoid a trough-like character and there must be a steel rail above it at the regulation height (≥900mm). Allow space for flower boxes if possible → ⑧.



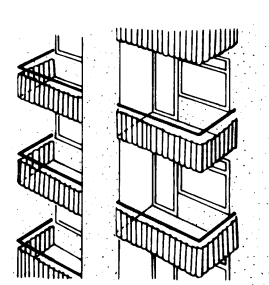
① Corner balcony



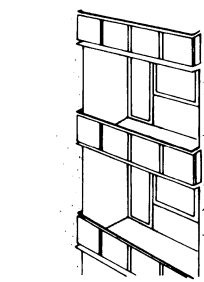
② Open balcony with screen



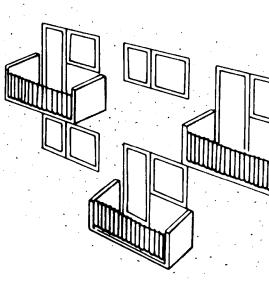
③ Balcony group with sight and wind screens



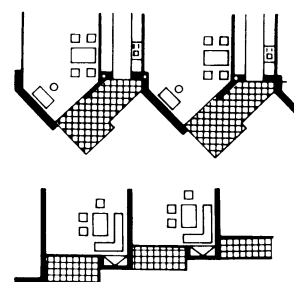
④ Balcony group with intermediate storage space for balcony furniture



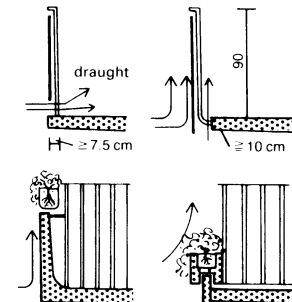
⑤ Inset balconies (loggia)



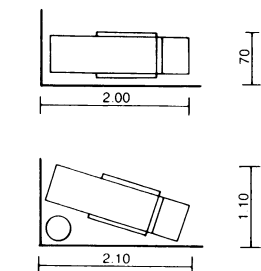
⑥ Offset balconies



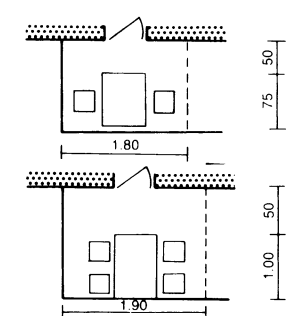
⑦ Offset balconies making use of angles and staggering



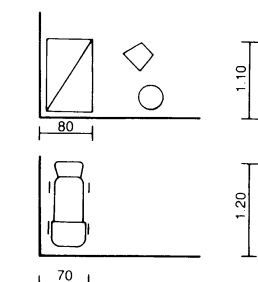
⑧ Parapet variants



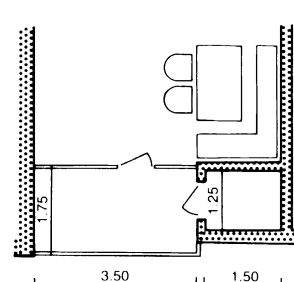
⑨ Reclining chairs



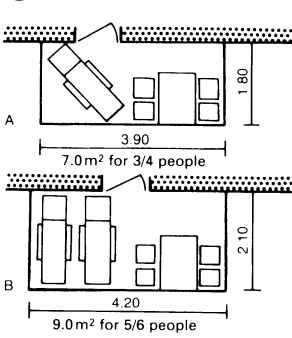
⑩ Seating around tables



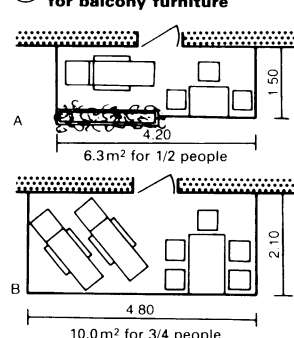
⑪ Child's cot and pram



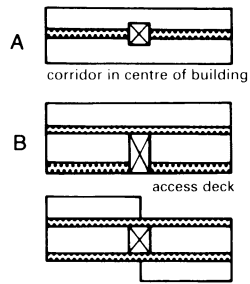
⑫ Balcony with storage space for balcony furniture



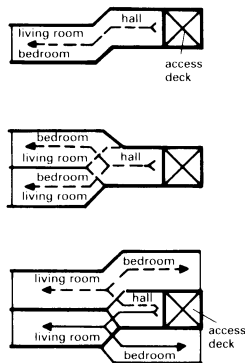
⑬ Balcony layouts



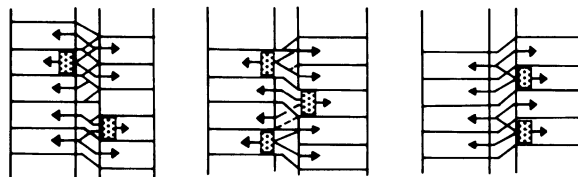
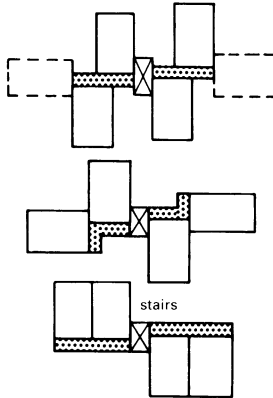
⑭ Balcony layouts



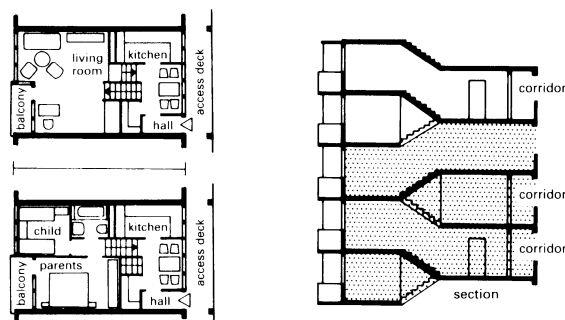
① Vertical connections



② Possible corridor arrangements

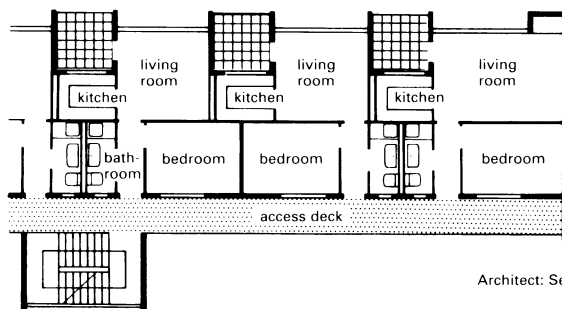


③ Section showing possible arrangement of corridors in the core of the building



④ Split-level flats with deck access

Architect: Hirsch



⑤ Stairway installed in front of the access deck: kitchens are lit and ventilated via an inset balcony

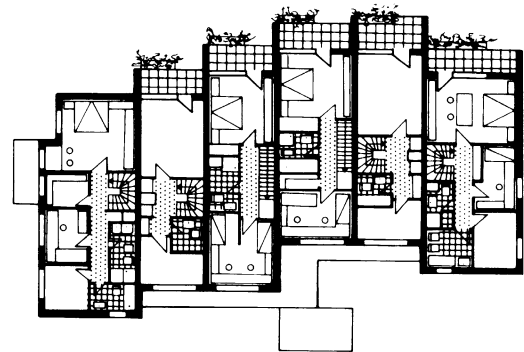
ACCESS CORRIDORS/DECKS

An alternative to the centralised layout (i.e. buildings with dwellings on each floor around a central staircase or lift) is to have the dwellings accessed from an internal corridor or a covered external walkway. This is more economical in large housing projects. Each level is served by one or more vertical connection points (lifts and/or stairs) which also lead to the main entrance to the building. In addition to stairways and lifts, vertical systems of service shafts are needed and there should be a clear differentiation of built-in, added and free-standing constructions. → ①

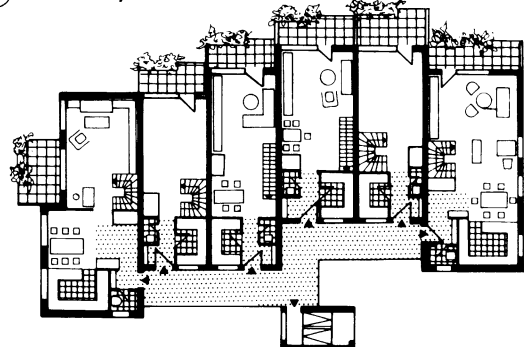
Dwellings on either side of an interior corridor have a single orientation and this makes it desirable to employ a design that uses two or more levels → ③. A similar arrangement can be exploited in buildings with an access deck running along the exterior → ⑥ + ⑦. Note that open access decks can cause problems in harsh climates.

It is considerably better if the dwelling is on two or more levels because it allows the functional requirements to be met more satisfactorily and half-storey split levels, for example, can be stacked easily → ②. Dwellings on only one level are particularly suitable as studio flats → ⑤.

To improve the relationship between circulation and dwelling areas the goal should be to minimise the length of horizontal access routes. Planning corridors on alternate floors provides the best arrangement for larger multi-level dwellings and good solutions can be attained by siting the deck access on alternate sides. The number of corridors can also be reduced with a mirrored staggering of maisonettes or a similar arrangement of split-level dwellings.



⑥ Roof storey



⑦ Floor beneath ⑥

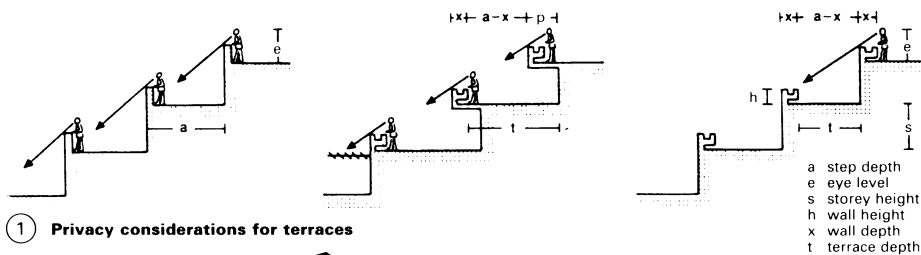
STEPPED HOUSING

Plots on steep slopes are highly suitable for the construction of stepped housing. The rake of the front of the building (ratio of storey height to terrace depth) can vary widely (e.g. 8°–40°) depending on the slope. Where the terraces are large (i.e. above 3.2m deep) the buildings are usually south facing and enjoy uninterrupted views. However, consideration must then be given to privacy → ①. Note that some cities have special regulations governing stepped housing.

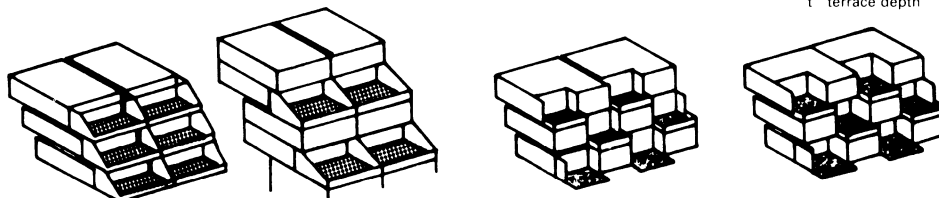
Stepped houses offer open space for relaxation and children's play similar to a conventional house with a garden. Plants on the terrace wall further improve living quality. These advantages have led to stepped housing being built on flat sites → ⑩ – ⑬ and projects to provide large internal spaces also invite the integration of stepped housing → ⑬.

Privacy can be improved by using an overhang → ② – ⑤ or progressively setting back each floor → ⑨. However, the key factor can be the width of the terrace wall, which can be calculated using the following equation:

$$x = a \frac{(e - h)}{s}$$



① Privacy considerations for terraces

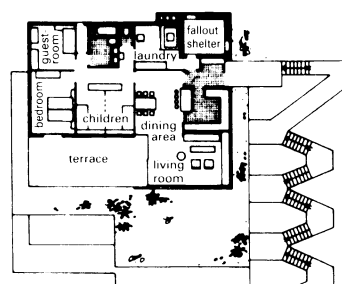


② Single-storey dwellings

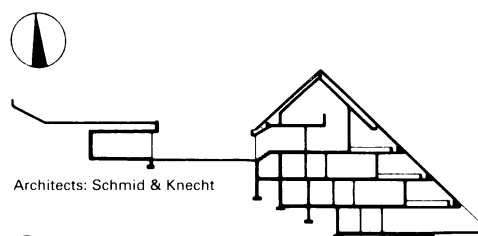
③ Two-storey dwellings

④ Asymmetrical plans

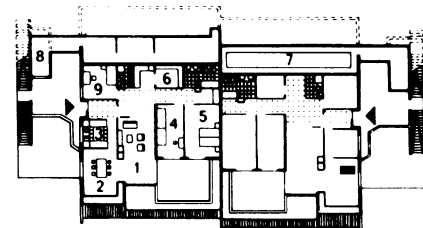
⑤ L-shaped arrangement



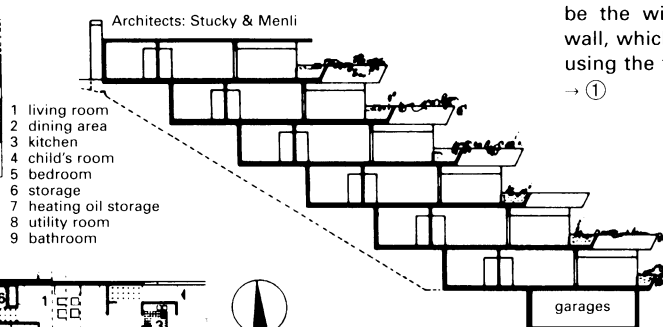
⑥ Plan → ⑦



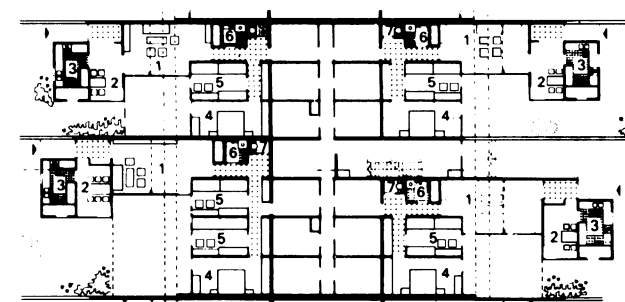
⑦ Section



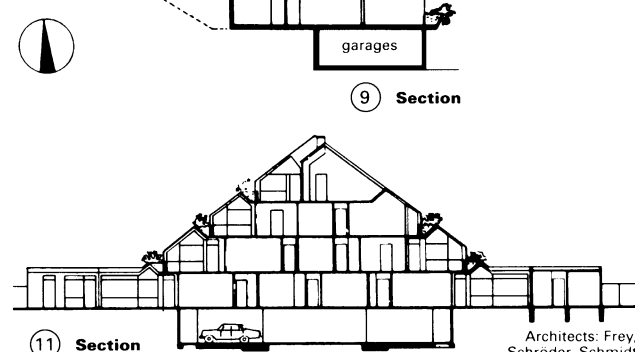
⑧ Plan → ⑨



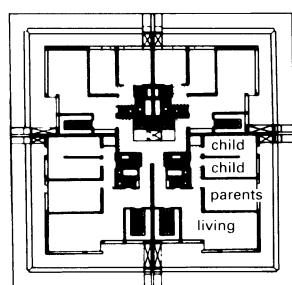
⑨ Section



⑩ Residential complex, ground floor → ①

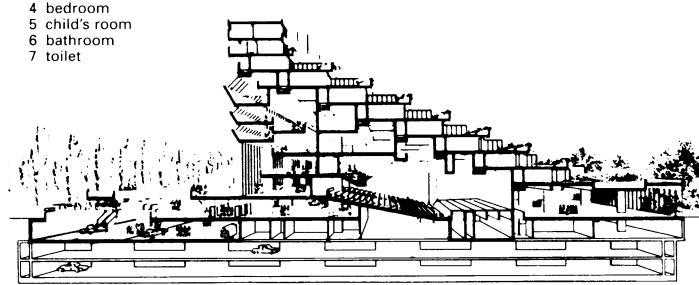


⑪ Section



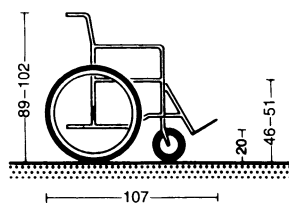
Architect: Buddeberg

⑫ Terraced housing, upper floor

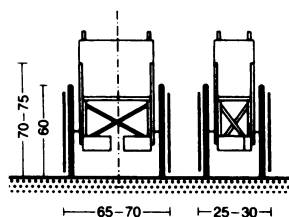


Design: E. Gisel

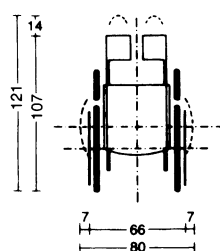
⑬ Section through a convention centre



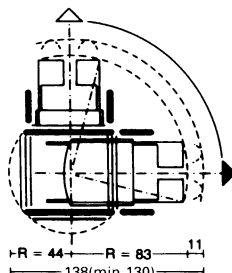
① Side view of standard wheelchair



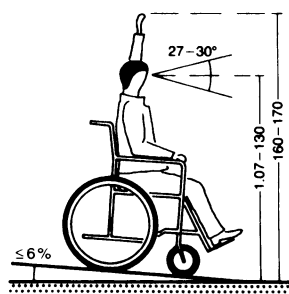
② Front view (and folded)



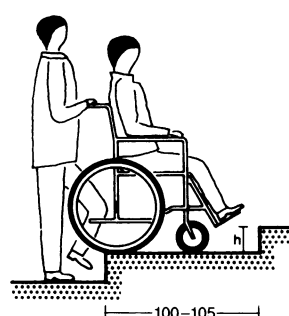
③ Plan view



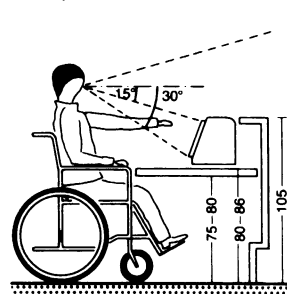
④ Turning circle



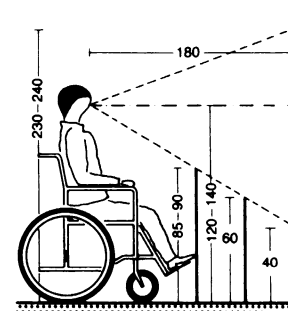
⑤ Wheelchair on a slope



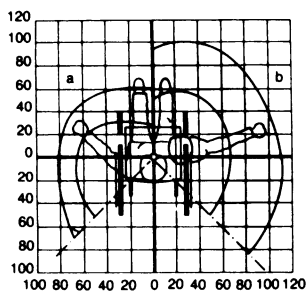
⑥ On stairs



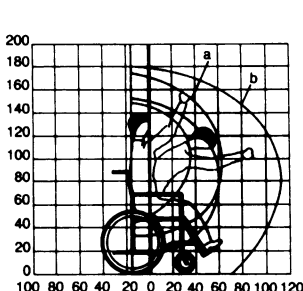
⑦ VDU workstation



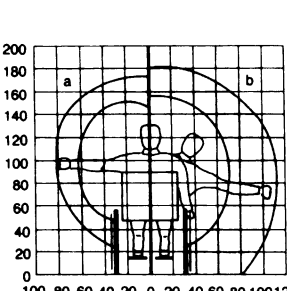
⑧ At a window



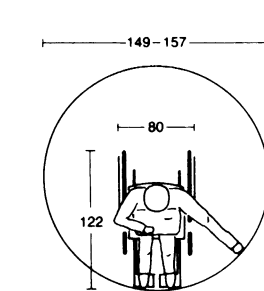
⑨ Plan view



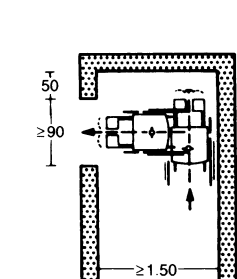
⑩ Side elevation



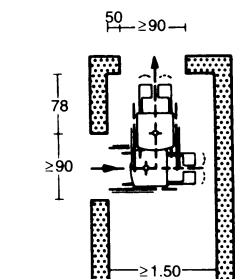
⑪ Rear elevation



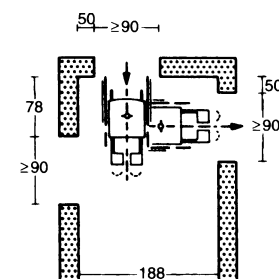
⑫ Minimum turning circle



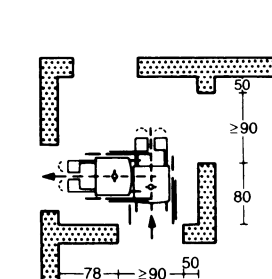
⑬ Door access with one door



⑭ with 2 doors



⑮ with three doors



⑯ with four doors

BUILDING FOR DISABLED PEOPLE

An environment for disabled people needs to be designed to accommodate wheelchairs and allow sufficient space for moving around in safety (see ①-④ and ⑨-⑫ for dimensions and area requirements). Example door and corridor widths are given in ⑬-⑯. All switches, handles, window fittings, telephone points, paper roll or towel holders, lift controls, etc. must be within reach of an outstretched arm ⑨-⑫. The layout of the WC, in particular, requires careful planning: assess how many doors, light switches etc. are needed. Consider technical aids (e.g. magnetic catches on doors and remote controls).

Access paths to the building should be 1.20-2.00 m wide and be as short as possible. Ramps should ideally be straight, with a maximum incline of 5-7%, and should be no longer than 6 m ⑤. The ramp width between the handrails should be 1.20 m. Corridors should be at least 1.30 m (preferably 2.00 m) wide; clear opening of doors, 0.95 m; height of light switches and electrical sockets, 1.00-1.05 m (use switches and control devices which have large buttons or surfaces).

During urban planning, consideration should also be given to providing wheelchair users with easy access to general amenities such as supermarkets, restaurants, post offices, pharmacies, doctors' surgeries, car parks, public transport etc.

Houses and Apartments

Accessibility: In the rented residential sector, access via corridors is the most common layout. This enables large numbers of angles and corners to be avoided; a straight main corridor is preferable. The entrance area should be of an appropriate size, with shelves and coat hooks planned in. The minimum area of entrance halls is 1.50×1.50 m, and 1.70×1.60 m for a porch with a single-leaf door. (It should be noted, however, that minimum recommended dimensions are often not very generous and in practice can prove to be too small.) For blind residents it is important to have an intercom system at the apartment door and the building's main entrance.

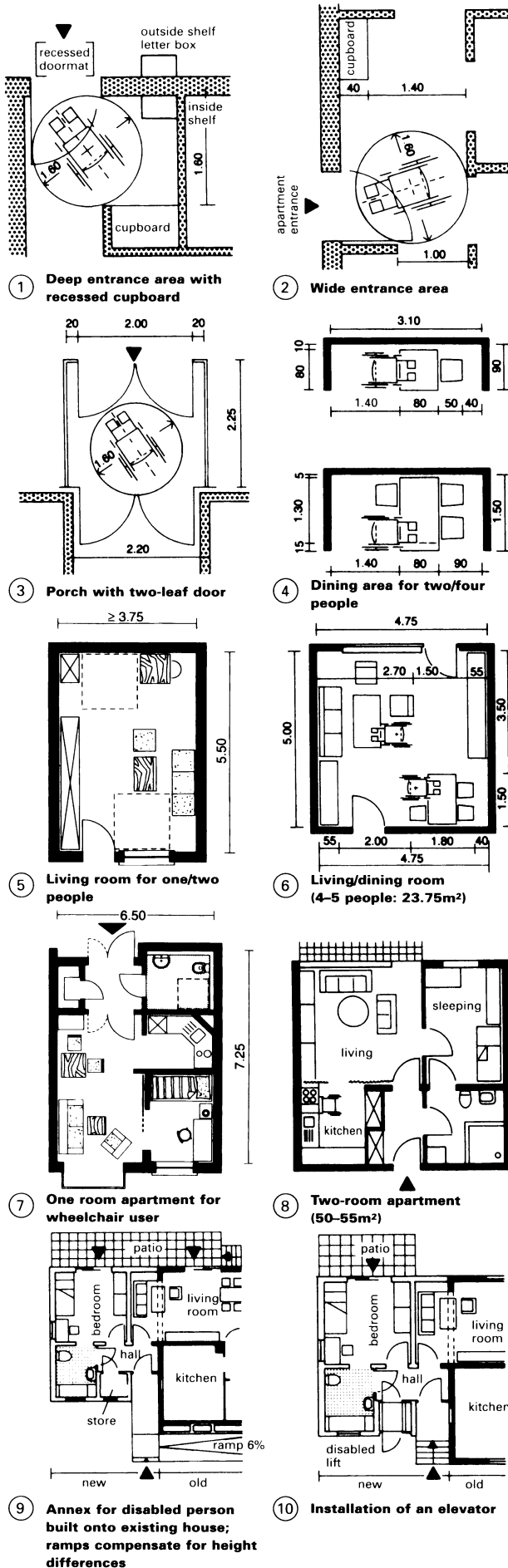
Living area: Living rooms should allow adequate free movement for wheelchair users and have sufficient space for two or three more visitors' wheelchairs. For blind people, additional space should be provided for their literature and tape equipment: Braille books and newspapers are roughly three times bulkier than their printed equivalents. Single disabled people need more space than those in shared households. In apartments, recommended minimum areas for living rooms with a dining area are: 22 m^2 for one person; 24 m^2 for two to four people; 26 m^2 for five; and 28 m^2 for six. The minimum room width is 3.75 m for a one- or two-person home → ⑤.

If an additional study area is to be incorporated, the floor area must be increased by at least 2 m^2 .

Kitchen: Ergonomic planning is of great importance in the kitchen to allow disabled people to utilise their capabilities to the full. The arrangement of the storage, preparation, cooking and washing areas should be convenient and streamlined. The cooker, main work surface and taps should be placed as close together as possible. Storage spaces must be accessible to wheelchair users (i.e. no high cupboards). The reach of the arm is roughly 600 mm horizontally and between 400 and 1400 mm vertically. The optimal working height must be adapted to suit each disabled person, within the range 750 – 900 mm, so it is desirable to have a simple adjustment mechanism.

Single-family houses: The single-storey family house with garden is often the preferred form of residence for disabled people. Their requirements can be satisfied easily in this type of accommodation: i.e. no steps at the entrance and no difference in level between the individual rooms and the garden; rooms can be connected without doors and custom designed to best suit the residents. However, two-storey family houses can also be suitable, even for wheelchair users, if a suitable means of moving between floors (vertical elevator or stair lift) is incorporated.

Multi-apartment dwellings: The grouping of apartments in multiple occupancy dwellings is a housing solution that offers disabled people an environment which is both sociable and supportive. In economic terms, it is rarely possible to convert ordinary apartments into adequate homes for the severely disabled, so they need to be included at the preliminary planning stage. It is once again preferable to situate apartments for disabled people at ground-floor level to avoid the necessity of installing lifts/elevators.



BUILDING FOR DISABLED PEOPLE

Conversions

The needs of disabled people are often not taken into account sufficiently in new building projects, so it is frequently necessary to convert existing residential units into appropriate apartments. Suitable buildings have a generous floor area and offer simple opportunities for alteration in accordance with the occupant's needs. The conversion measures required can include: alterations to the plan, including building work (which is limited by structural considerations, the type of construction and floor area); alterations to services, bathroom and kitchen fittings etc.; and supplementary measures, such as the installation of ramps, lifts and additional electrical equipment. Attention should also be paid to access from the street, any floor coverings which require changing and the creation of a car parking space with ample allowances for wheelchair users. The extent of the alterations depends on the degree of disability of the residents and the specific activity within the apartment. As a result, the conversion measures will often be specified in conjunction with the disabled person and tailored to his or her needs.

Prior to commencing conversion work, the plan and structure of the existing apartment should be examined carefully. Ground floor apartments of an adequate size are particularly suitable because additional services (passing through the basement) can be installed more cheaply and entrance modifications are easier.

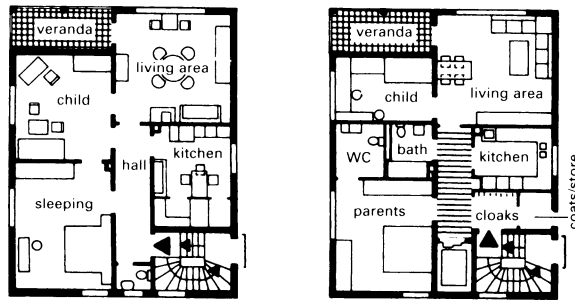
Extent of the conversion work: Three groups of disabled people can be identified, each with corresponding requirements:

- Disabled members of a family (husbands, wives, children) who go to work or school outside the home. Alterations in such cases relate to access to the house/apartment, furnishings and provision of sufficient freedom of movement in the living and sleeping areas, and specially adapted facilities in the bathroom/WC.
- Disabled persons who carry out household tasks. Here, additional alterations must be made to the kitchen and elsewhere to simplify work in the home.
- Severely disabled persons who are only partially independent, if at all, and thus require permanent care. Extra space must be provided for manoeuvring wheelchairs and facilities to aid the work of carers should be added. Note that self-propelled wheelchairs require most space.

Comparison of sizes of living area: While apartments for the elderly are no larger in area than standard apartments (any changes consisting only of adjusting door widths and tailoring the functional areas), living areas for disabled people need to be increased appropriately, particularly for wheelchair users and the visually impaired. Regulations often require additional rooms in these apartments as well as a modified bathroom with WC for wheelchair users.

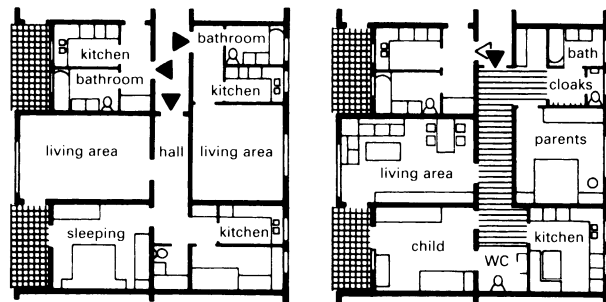
Recommended values for habitable areas are: 45–50 m² for a one-person household; 50–55 m² for two people.

apartment	for disabled (m ²)	standard (m ²)
1 person studio	49.99	40.46
2 person apartment	67.69	56.47
3 person apartment	94.80	79.74
4 person apartment	95.26	80.50
1 person apartment	53.70	43.93
3 person apartment	101.17	86.38
4 person apartment	103.23	88.33



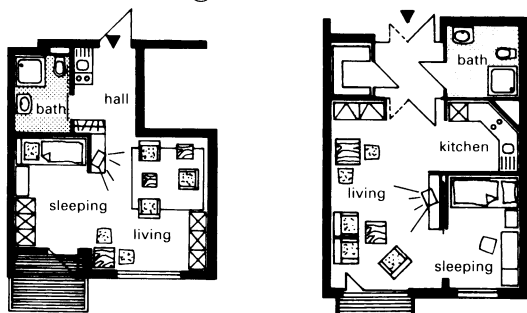
1 Family house before conversion → 2

2 Converted to an apartment for severely disabled



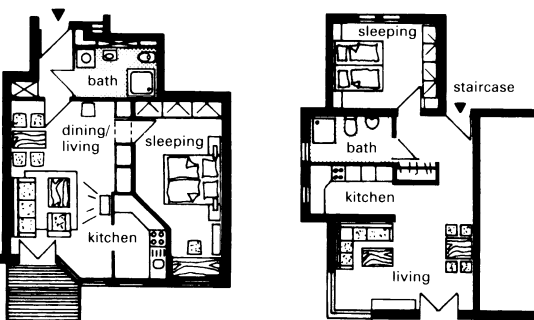
3 One and two-room apartment prior to conversion (visually impaired, child) → 4

4 After conversion



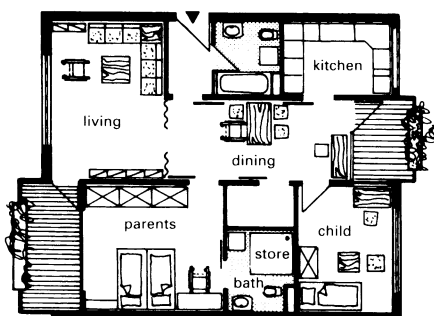
5 Studio apartment (40 m²)

6 Studio apartment (45 m²)

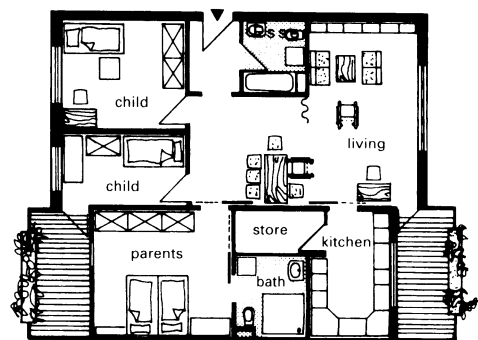


7 Two-room apartment (54 m²)

8 Flat (60 m²)



9 Three-room apartment (95 m²)

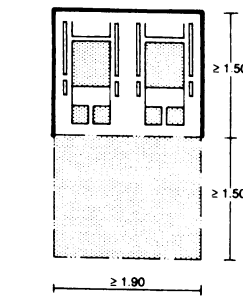
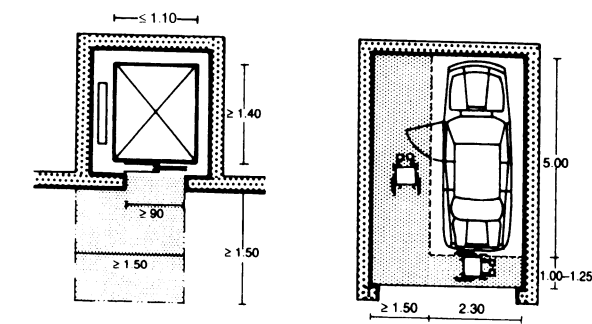
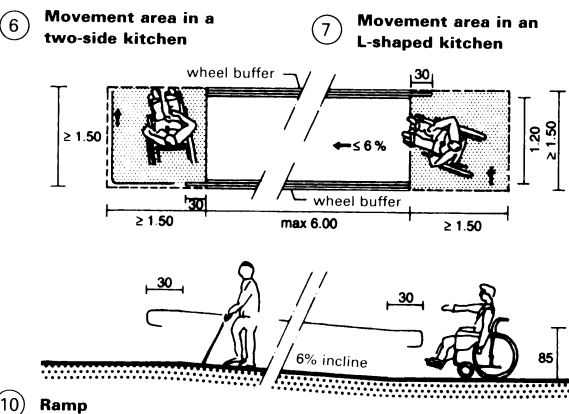
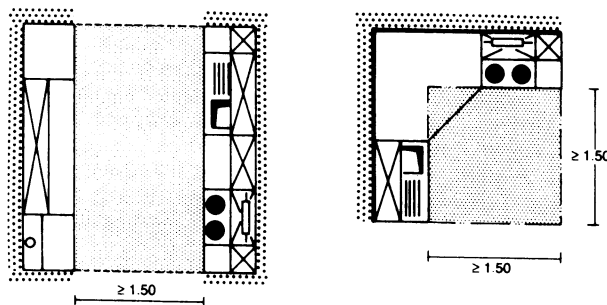
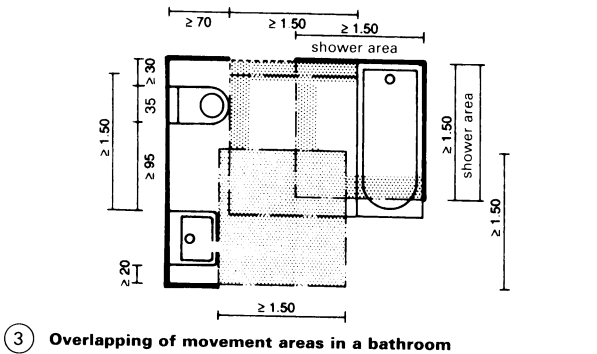
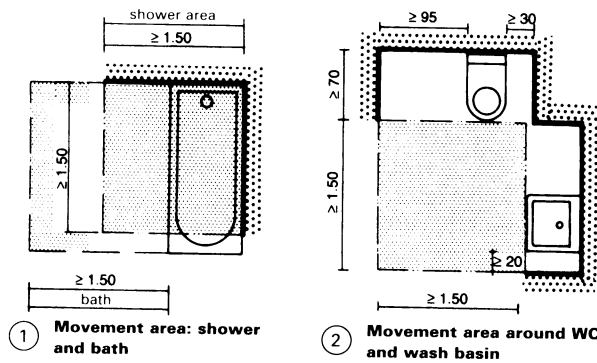


10 Four-room apartment (110 m²)

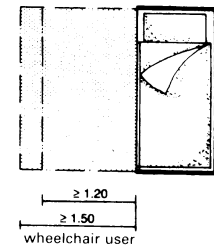
11 Example apartment areas before/after conversion

BARRIER-FREE LIVING

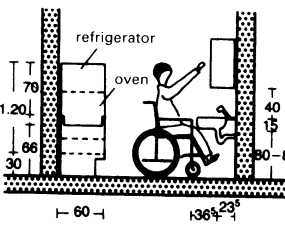
A functionally efficient and well-designed living space is of great importance to people with disabilities. To turn through 180° a wheelchair user requires 1500–1700 mm. This requirement sets the minimum sizes and circulation space of landings, rooms, garages etc. shown here. Entrances should not have a threshold or steps and revolving doors are not permitted. Doors should have at least 900 mm clear width. Bathroom/WC doors must open outwards. The minimum width for a landing is 1500 mm, and landings of over 15 m in length should include a circulation area (1800 × 1800 mm). All levels and facilities inside and outside a building must be accessible without negotiating steps; if necessary, include a lift → ⑬ or ramps → ⑩.



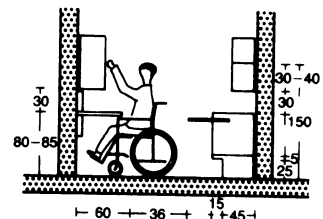
④ Space requirements: wheelchair and movement area



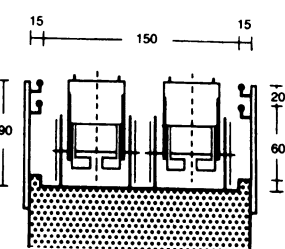
⑤ Space requirement beside a bed for user and non-user of a wheelchair



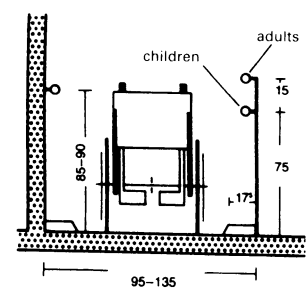
⑧ Dimensions around the sink, oven and refrigerator



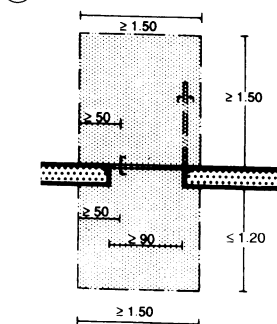
⑨ Dimensions in kitchens



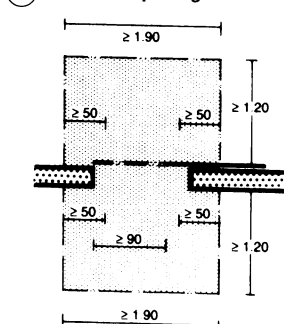
⑪ Section of ramp



⑫ Halls and passages

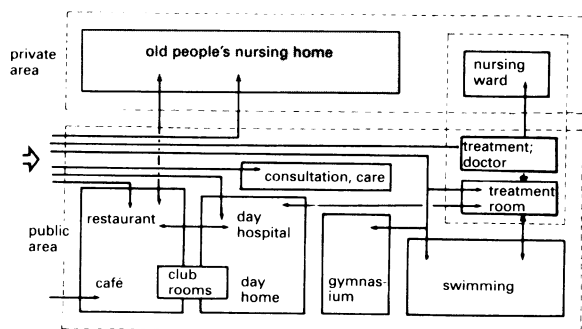


⑮ Movement areas in front of hinged doors and ...

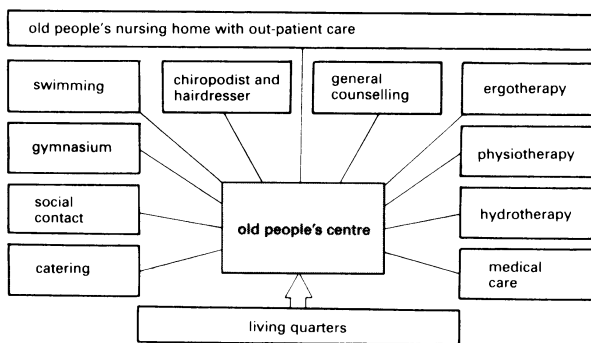


⑯ ... in front of sliding doors

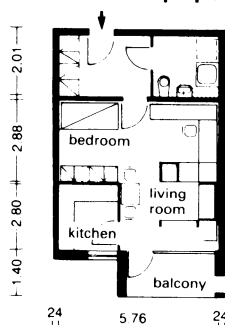
OLD PEOPLE'S ACCOMMODATION



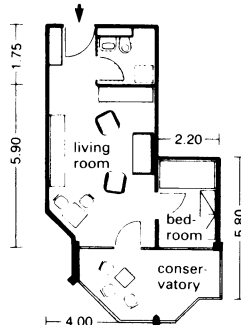
① Functional diagram



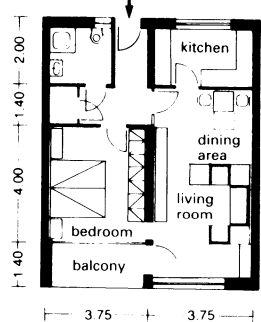
② Functions in an old people's centre



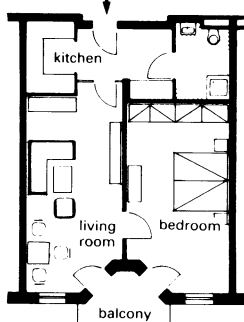
③ One-person apartment 41 m²



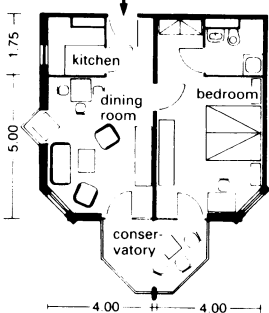
④ One-person apartment 37 m²



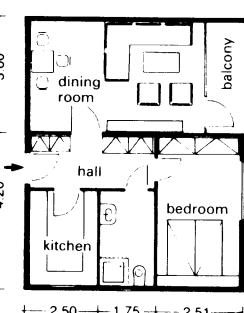
⑤ Two-person apartment 58 m²



⑥ Two-person apartment 62 m²



⑦ Two-person apartment 56 m² with conservatory 9 m²



⑧ Two-person apartment 55.5 m²

Depending on the degree of support required, there are three main types of accommodation and care for the elderly: (1) old people's housing, (2) old people's homes and (3) nursing homes.

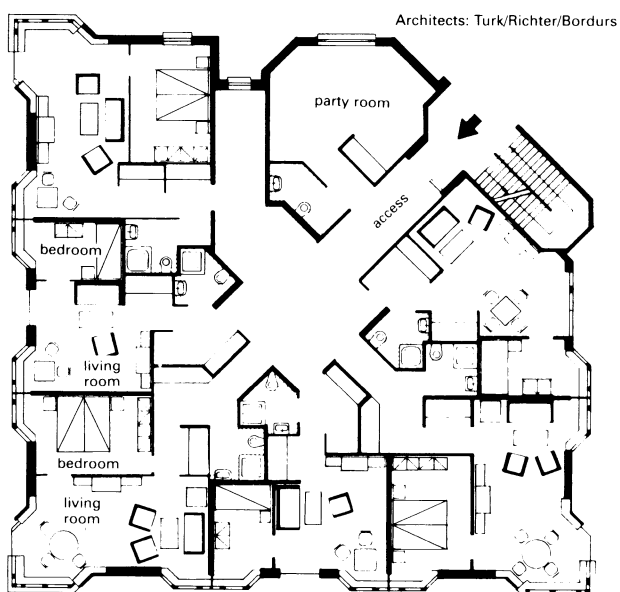
In the United Kingdom, depending, inter alia, on type of dwelling and facilities provided, housing for elderly people can be classified into: category one housing, category two housing, sheltered housing, very sheltered housing, retirement housing, extra-care housing, residential care homes, nursing care homes, and dual registration homes. In the United States, although similar building types have been developed, the terminology differs. The building types that house elderly people in the United States can be described as independent retirement housing units, congregate housing, personal care housing, skilled nursing home, and life care communities.

Old people's housing → ③ - ⑧ consists of self-contained flats or apartments which cater for the needs of the elderly so that they can avoid moving into an old people's home for as long as possible. Such housing is usually scattered around residential areas, with a density of 2-10%. Flats for one person are 25-35 m²; for two people 45-55 m². Sheltered balconies ≥ 3 m².

Sheltered housing is generally a group of flats (each ≥ 20 m²) in one building, with common rooms and a tea kitchen. A good solution is to build these facilities close to a nursing home for the elderly which offers meals, leisure, recreation and various therapies. Provide one car parking space per 5-8 residents. Note that heating costs will be 2% higher than normal.

Old people's homes offer residential care facilities and must conform to regulations on planning, licensing. The large amount of ancillary space required means the most economic size is about 120 places. Meals, entertainment and therapies are provided and an integrated nursing section for short-term care. General design features: stairs 16/30cm without open riser; edges of steps defined with a colour; handrails on both sides of stairs and in corridors; where necessary, lifts for moving patients on stretchers or in folding chairs. The buildings should all be adapted for the disabled and have open spaces with benches.

Homes should be sited close to the infrastructure of a town or village and to public transport. The inclusion of a daycare centre should be considered to provide opportunities for people living independently to make contact and receive non-residential care (approximately one daycare centre is needed per 1600 elderly people).



⑨ Ground floor of residential wing, old people's home and nursing home

OLD PEOPLE'S ACCOMMODATION

Nursing homes for the elderly provide care for people who are chronically ill and in need of medical attention. The residential area consists of a 50:50 split of single and double rooms → ① - ④. It must be clearly separated from the administration and office areas → ⑥. Residents are frequently split into groups consisting of 8-10 people, with a shared lounge and possibly a tea kitchen where meals may also be eaten → ⑤. Provide one treatment room per two groups.

Central facilities are best grouped together on ground floor. Rooms are required for administration, consultation, occupational therapy, physiotherapy, chiropody. In addition, rooms for entertainment, common rooms, cafeteria and hairdressing should be provided.

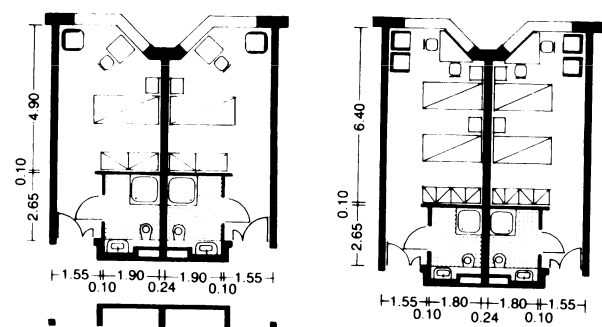
Some key issues affecting design

When considering building layout, measures will be required to reduce the risk of cross-infection. Changes in level are best avoided but if this is not possible, ramps must be provided inside and outside building. Circulation distances for residents should be kept to a minimum and all main routes will need handrails. Corridors must be wide enough to allow two people in wheelchairs or walking with frames to pass each other comfortably.

Careful interior design is necessary. Doors must not restrict the residents' ability to get around; automatic opening may be required. Furniture and fittings must be suitable for older people.

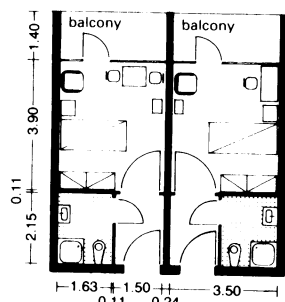
Consistent temperatures are required and contingency plans for providing heating in the event of power failures should be considered. The ability to control temperature and sunlight penetration, particularly in bedrooms and sitting rooms, is important to residents. Hot pipes and heaters must be protected: the maximum acceptable surface temperature is around 43°C.

Hot water systems must be designed to resist infection such as that causing Legionnaire's disease.

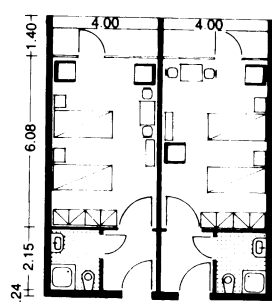


① One-bed nursing rooms

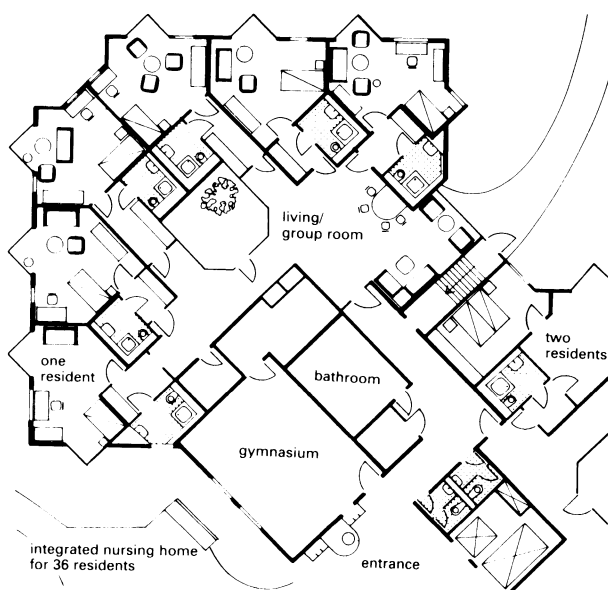
② Two-bed nursing rooms



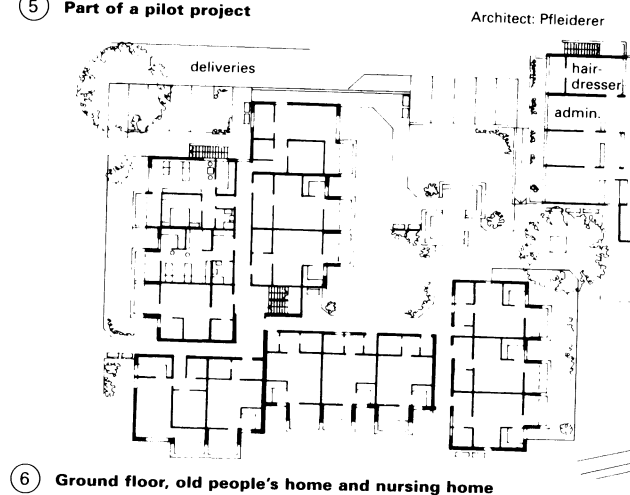
③ One-bed nursing rooms



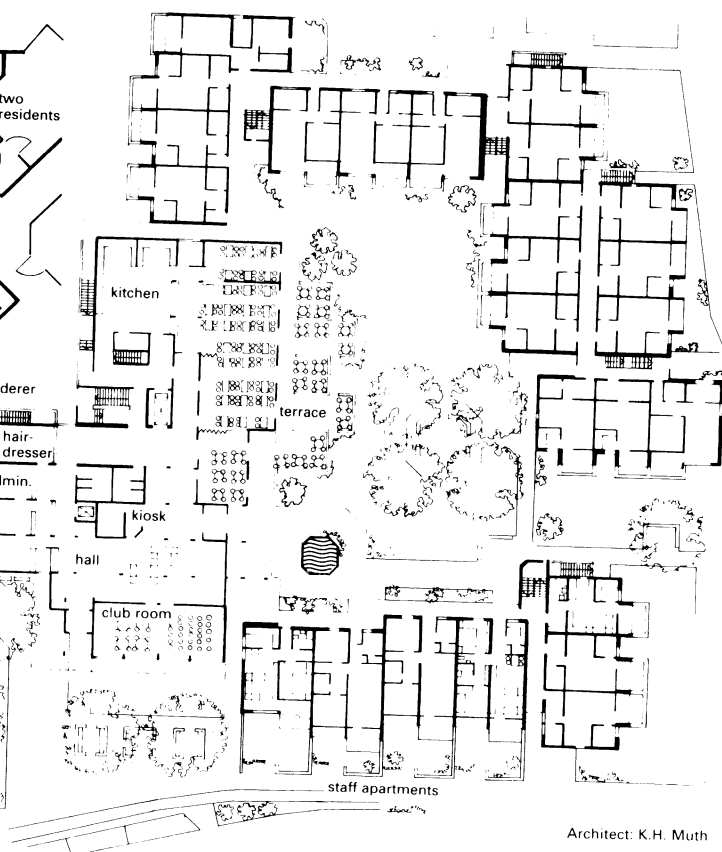
④ Two-bed nursing rooms



⑤ Part of a pilot project

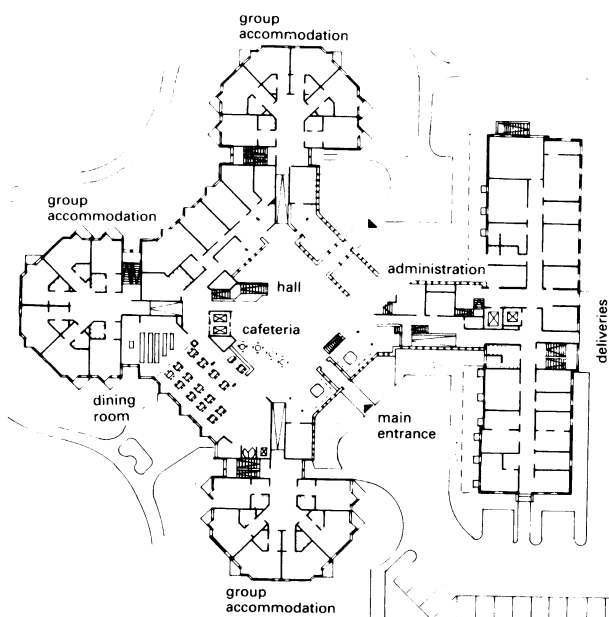


⑥ Ground floor, old people's home and nursing home

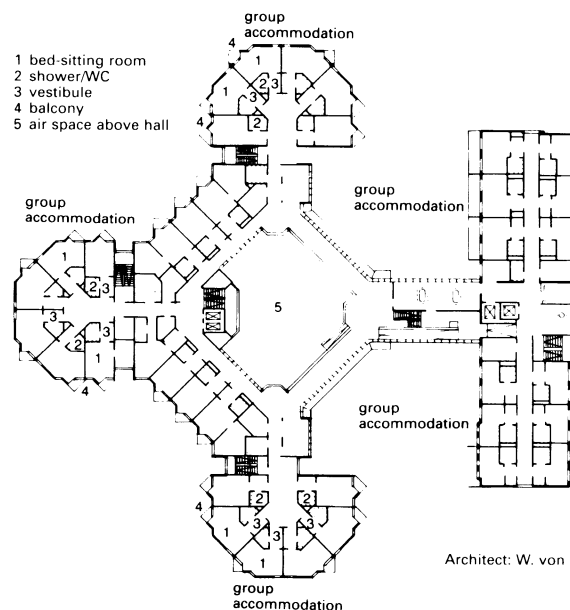


Architect: K.H. Muth

OLD PEOPLE'S ACCOMMODATION

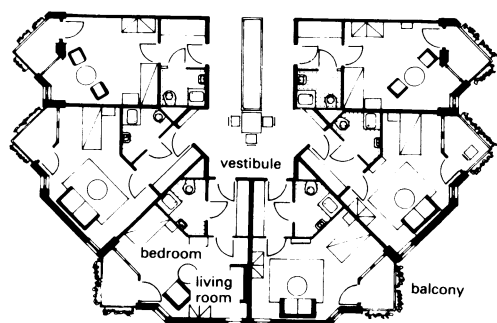


① Ground floor, old people's centre in Viersen

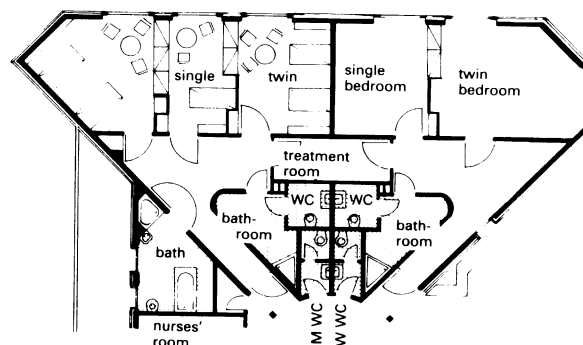


Architect: W. von Lom

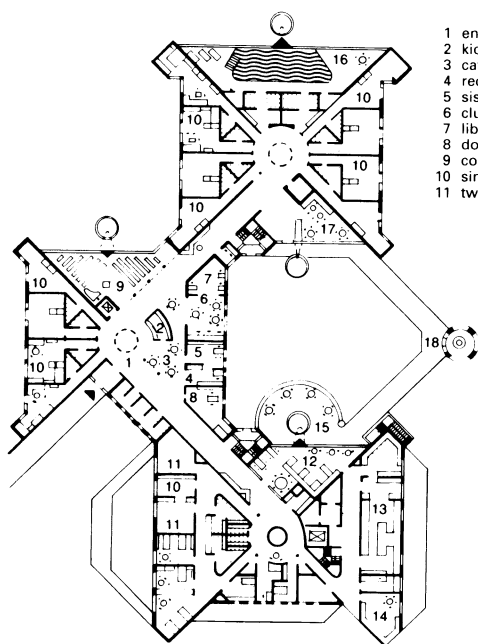
② First floor → ①



③ Part of floor plan → ①, ②

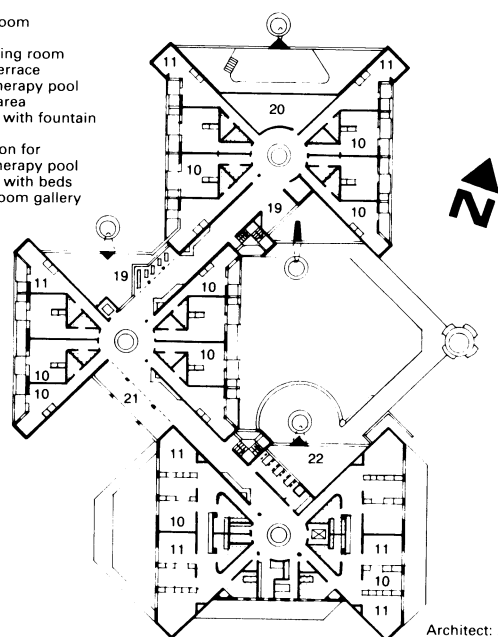


④ Typical nursing unit → ⑤, ⑥



- 1 entrance hall
- 2 kiosk
- 3 cafeteria
- 4 reception
- 5 sister's office
- 6 club room
- 7 library
- 8 doctor
- 9 common room
- 10 single bedroom
- 11 twin bedroom

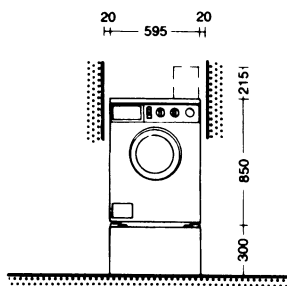
- 12 dining room
- 13 kitchen
- 14 staff dining room
- 15 dining terrace
- 16 physiotherapy pool
- 17 lounge area
- 18 pavilion with fountain
- 19 gallery
- 20 ventilation for physiotherapy pool
- 21 veranda with beds
- 22 dining room gallery



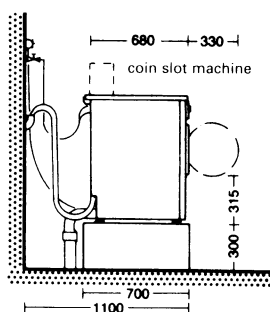
Architect: A. Riege

⑤ Ground floor, old people's home in Mühlheim

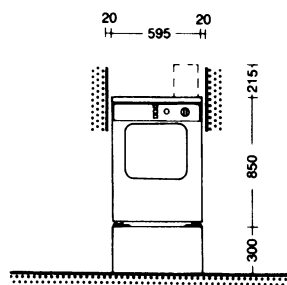
⑥ First floor → ⑤



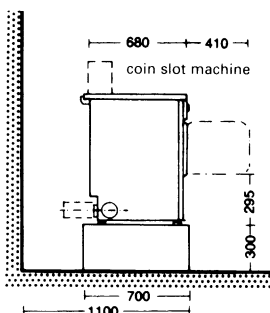
① Automatic washing machine



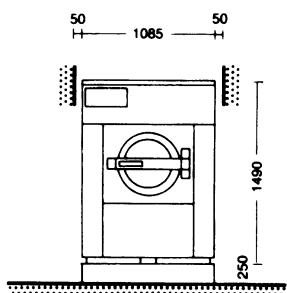
② Side view → ①



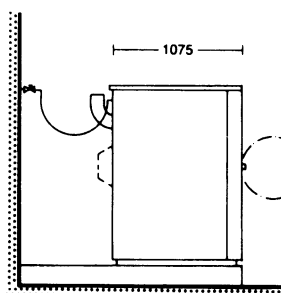
③ Automatic drier



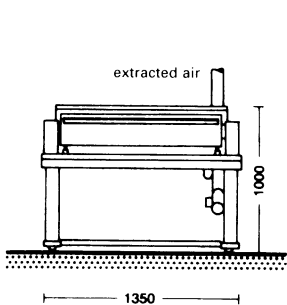
④ Side view → ③



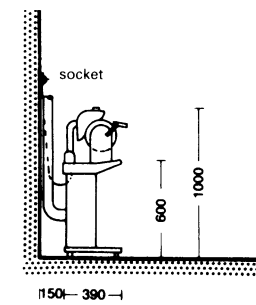
⑤ Large automatic washing machine



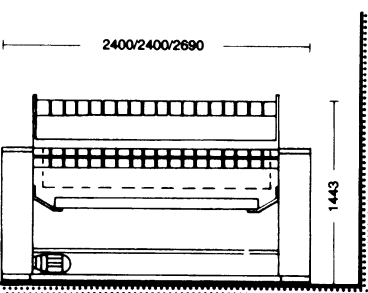
⑥ Side view → ⑤



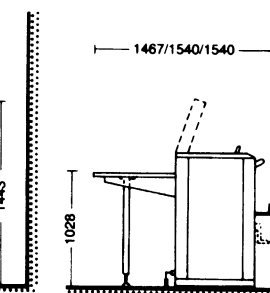
⑦ Roller iron



⑧ Side view → ⑦



⑨ Flat-bed iron



⑩ Side view → ⑨

The following figures may be used to estimate the amount of washing arising per week in kg of dry laundry:

- Domestic: approx. 3kg/person
(proportion for ironing approx. 40%)
- Hotels: approx. 20kg/bed
(bedclothes and hand towels changed daily)
approx. 12-15kg/bed
(change of bedclothes 4 times/week)
approx. 8-10 kg/bed
(change of bedclothes 2-3 times/week)
approx. 5kg/bed
(tourist hotel, change of bedclothes once/week)

The values given include restaurants.

- Guest-houses: approx. 8kg/bed
Restaurants: approx. 1.5-3.0kg/seat

The proportion of ironing is about 75% for hotels, guest-houses and restaurants.

- Old peoples' homes: Residential: approx. 3 kg/bed
Nursing home: approx 8kg/bed
Incontinent: approx. 25kg/bed
- Children's home: approx. 4kg/bed
for babies: approx. 10-12kg/bed

- Medical nursing homes: approx. 4 kg/bed
Incontinent: approx. 25kg/bed

The proportion of ironing is about 60% for the above homes.

Hospitals and clinics (up to about 200 beds):

- General hospital: 12-15kg/bed
Gynaecological/
maternity unit: approx. 16kg/bed
Children's clinic: approx. 18kg/bed

The proportion of ironing is about 70% for hospitals.

- Nursing staff: approx. 3.5 kg/person

$$\text{Required washing capacity} = \frac{\text{Amount of washing/week}}{\text{Washing days/week} \times \text{number of washes/day}}$$

Example calculations:

- 1) Hotel with 80 beds; utilisation 60% = 48 beds
Four changes of bedclothes/week and daily change of hand towels = approx. 12kg/bed
48 beds at 12 kg laundry = 576 kg/week
Table and kitchen washing, approx. 74 kg/week
650 kg/week

$$\text{Required washing capacity} = \frac{650}{3 \times 7} = 18.6 \text{ kg per wash}$$

- 2) Hotel with 150 beds; utilisation 60% = 90 beds
Daily changes of bedclothes and hand towels = 20kg/bed
90 beds at 20 kg laundry = 1800 kg/week
Table and kitchen washing, approx. 200 kg/week
2000 kg/week

$$\text{Required washing capacity} = \frac{2000}{3 \times 7} = 57.1 \text{ kg per wash}$$

- 3) Old people's and nursing home: 50 residential beds, 70 nursing beds
70 nursing beds at 12kg clothes = 840kg/week
(suspected of being infected)

$$\text{Required washing capacity} = \frac{840}{5 \times 5} = 33.6 \text{ kg per wash}$$

- 50 old people's beds at 3kg laundry = 150 kg/week
Table and kitchen washing, approx. 100 kg/week
250 kg/week
(not suspected of being infected)

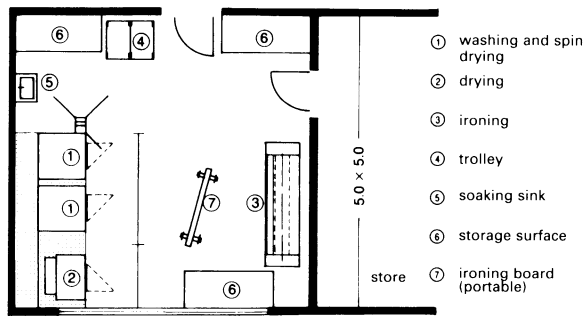
$$\text{Required washing capacity} = \frac{250}{3 \times 6} = 8.3 \text{ kg per wash}$$

LAUNDRIES

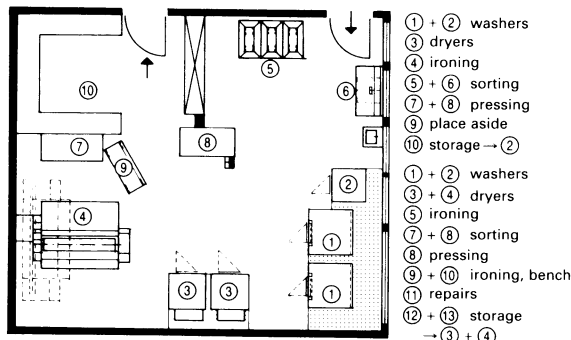
Some laundries may have to be separated into 'clean' and 'soiled' sections (e.g. in hospitals), each with its own entry point → ⑤ – ⑥ + ⑧).

On the soiled side, the floors, walls and surfaces of all installed equipment must be suitable for wet cleaning and disinfection.

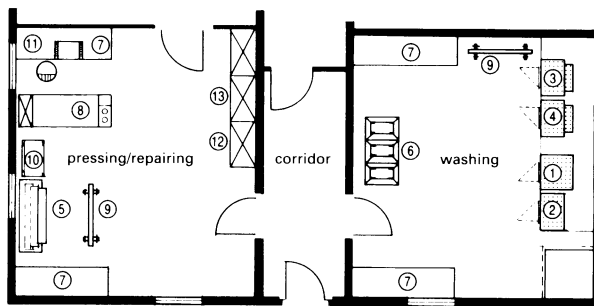
Walkways between the soiled and clean areas should be designed as personnel air-lock systems with facilities for hand disinfection and space for protective clothing. The doors in the air-lock system must be linked such that only one door can be opened at a time.



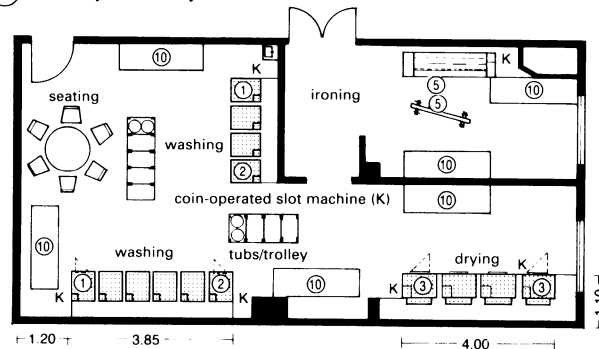
1 Small hotel laundry



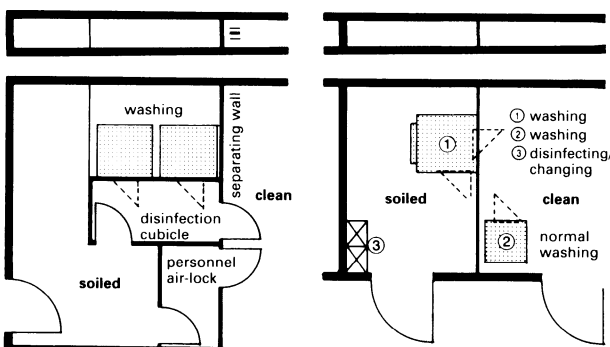
2 Laundry of average size



3 Laundry in two separate rooms



4 Self-service laundry/laundrette



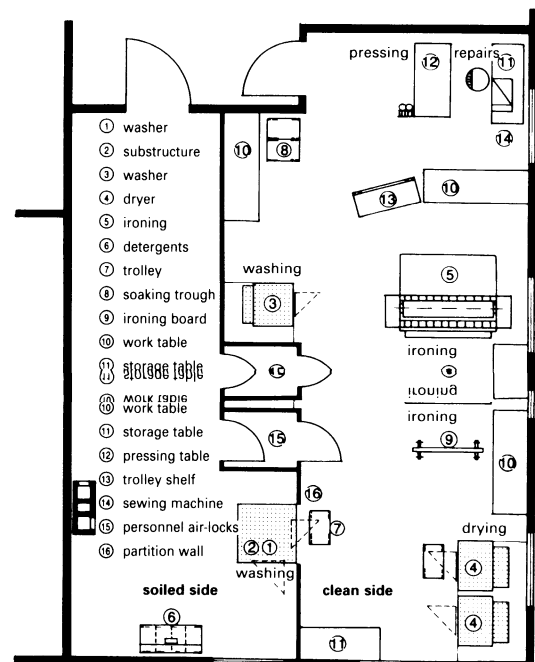
5 Single-door washing machines in disinfection cubicle

6 Clean and soiled laundry separated

	weight g
men's clothing	
shirt	170
vest	light 100, heavy 150
underwear	briefs 75, boxer 180
pyjamas	450
handkerchief	20
socks (pair)	70
women's clothing	
blouse	140
underwear sets	140
petticoat	75
pyjamas	350
nightdress	170
handkerchief	10
apron	170
smock	130
children's clothing	
dress	110
underwear	80
jacket, pullover	75
bib	25
handkerchief	15
socks (pair)	70
tights	100

7 Average weight of clothes items

	weight g
for swimming	
beach/bathrobe	900
bath towel	100 x 200 800
beach towel	67 x 140 400
hand towel	50 x 100 200
swimming trunks	100
swimming costume	1-piece 260, 2-piece 200
bedclothes	
duvet cover	160 x 200 850
sheet	150 x 250 670
top sheet	140 x 230 600
pillow case	80 x 80 200
table and kitchen linen	
tablecloth	125 x 160 370
table cover	125 x 400 1000
serviette	70 x 70 80
hand towel	40 x 60 100
dish towel	60 x 60 100
working clothes	
working suit	1200
dungarees	800
apron	200
men's overalls	500
women's overalls	400



8 Laundry in an old people's home