





1 Main entrance shows simple but effective detailing and crisp brick retaining walls, emphasising existing trees



OLD PEOPLE'S HOUSING

At Millgate, Newark, Notts for Newark Housing Association Ltd by Gordon Benoy & Partners partner in charge Brian Elsworth assistant architects Ken Pike and Guy Taylor quantity surveyor Gordon Benoy & Partners' qss dept in association with The George Hutley Partnership heating services Charles Beal, Paterson & Partners

ARCHITECT'S ACCOUNT

The Newark Housing Association Ltd was set up in 1968 in answer to local demand for housing for the elderly other than on local authority estates. The association was able to purchase a site on the south side of Newark, covering one acre but divided into two equal parts by a minor road and bounded on the east and west by main trunk roads. The northern part of the site contained an old mansion, Southfield House, which was reluctantly demolished.

The brief was to provide as many two-person housing units suitable for old people plus essential facilities (such as communal lounge and kitchen, warden's flat, and laundry) as could be accommodated on half an acre. The southern area of land was to be used for car parking only.

26 two-person flats, one single unit and a five-person warden's flat were incorporated, as well as the other facilities. The flats are of a standard design with variations to give individuality. They are to full Parker-Morris standards and are somewhat over the minimum area.

The complex arrangement of units can be appreciated from the outline drawing \mathbf{A} and the whole is reminiscent of a cubist sculpture in the early Vantongerloo style. This approach also produces interesting spaces within the site which help to overcome the sociological problems of this type of development.

The flats either look out onto the busy thoroughfare or into quiet internal courts; a walk around the site produces a succession of alleyways, pleasant yards, paved gardens, sheltered lawns and quiet suntraps. The designer has tried to produce an environment of lasting interest.

The planning authority accepted the project readily, the high density and intricate spaces in warm red brick being typical of the locality.

The scheme was within the MHLG cost yardstick with tolerance, and construction started in November 1969 to com-

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APPRAISAL

by Thomas D. Muir and Dilys Page

Southfield House is sheltered housing at its best. Designed by Gordon Benoy & Partners and opened in March 1971, the scheme consists of 27 self-contained flats, warden's flat, tenants' lounge, laundry room and guest suite. In a wellequipped kitchen adjoining the warden's flat and lounge-dining area, a midday meal is prepared on three days a week for those who want it. A regular chiropody and hairdressing service is also available.

One of the scheme's most outstanding features is the privacy which the design and layout give each tenant. The importance of individual privacy in any kind of housing cannot be overstated, but it is much more difficult to achieve where adequate support must be given to those who need it.

At Southfield House, the necessary facilities and support are provided without compromising the independence of those active tenants whose only needs are a feeling of security. However, the success of sheltered housing schemes depends a great deal on the personal qualities of those in charge of them. Southfield House is deliberately designed to allow individual privacy, but it is the warden and her husband who make it effective privacy.

The Newark Housing Association is typical of hundreds of voluntary groups in this country which provide housing for the elderly. Unlike the minority of better-known organisations operating nationally, such as the Hanover Housing Association, the Abbeyfield Societies and Help the Aged, most of these associations are small-scale, local in scope and run on an entirely voluntary basis¹. They are invariably formed to carry out one small scheme.

A large number fall by the wayside, defeated by lack of experience, failure to secure sites, or insufficient capital to carry them over the often lengthy period between acquiring a site and finalising loan and subsidy arrangements with the local authority.

It is difficult enough for a group of inexperienced people to find their way through the administrative thickets standing between their idea and its implementation. The situation is complicated by the fact that many of our smaller local authorities are as inexperienced in dealing with housing associations as the associations are in dealing with local and central government departments. It is almost miraculous that anything is ever achieved.

The Newark Housing Association is a classic example of success in the voluntary housing field. This is largely due to personal initiative and persistence, plus the right combination of talent and skill on its committee (and a certain amount of good fortune in being able to borrow privately to acquire the site).

Sheltered housing is a comparative newcomer to the housing scene, although it has its antecedents in medieval almshouses². However, despite the obvious merits, well under 5 per cent of old people live in sheltered housing, and progress even in the local authority sector is very slow. On the other hand, it is clear that the locally-run housing association is admirable for work of this kind, and one hopes that schemes such as Southfield House will commend this sort of activity to like-minded groups elsewhere.

Site

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The flats are on the southwest side of Newark, a ten-minute bus ride from the centre of the town. Lack of a reasonable

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range of shops within easy walking distance seems to be the only obvious disadvantage of the site; this is fairly adequately compensated by the half-hourly bus service to town, and by mobile shops which call four times a week delivering bread, groceries, vegetables and fish. The county library also makes monthly calls.

The immediate surroundings are pleasant, if fairly quiet. There is a park a few minutes' walk away, and the outlook from most of the flats is over the river to open country, taking in the power station—which is quite attractive.

The scheme

The initial impression 2 of Southfield House is of a highdensity development, making maximum use of the available land. In fact, on this half-acre site, self-contained accommodation for 28 households, all to full Parker Morris standards, has been provided. The accommodation takes the form of one bedsitter, one three-bedroom flat and 26 two-person (one-bedroom) flats. Communal facilities (a generous lounge/dining room, kitchen and laundry room) are also provided for the tenants.

The warden's accommodation is nominally a two-bedroom flat, but a third bedroom, with a toilet suite next door, can be used as a guestroom when required. This is often used as a hobbies room, and activities such as hairdressing and chiropody take place regularly.

The actual density of this development is equivalent to almost 120 people to the acre, which is quite an achievement, considering the constraints given in the Ministry's guidance³. However, it is only on further examination of the standards maintained that the architect's true achievement can be measured.

At first sight the development looks like a row of separate units rather than a single building **4**. This effect is created by the irregular Boundary Road frontage, which was achieved by setting back some of the units and projecting the first floor flats as overhangs. The device is highly effective in breaking down the single 'institutional building' appearance which many of these developments have. It is further emphasised by allowing access from several of the recesses **1**, **9**; there are no less than seven possible means of entry to the building.

Unfortunately, part of this advantage is destroyed by a dwarf wall round the site which limits access to only three of these entrances. This situation could have been improved significantly by breaking the wall on the Victoria Street side, so opening up the shortest route to the shops **3**. The local planning authority must be blamed for this omission, as they wanted to restrict access onto the busy Victoria Street hardly a valid reason when there are only a dozen or so people likely to use the entrance.

One of the major successes of this design is the privacy it affords tenants in terms of access to the outside from each flat. No flat is grouped with more than seven others around a single staircase (in which case, four are on the ground floor) and there is more than one route from each staircase to the

 Southfield House from across car park south of Boundary Road
 Corner of Boundary Road and Victoria Street. Note distance between east entry to building complex, right, 4 From this position massing gives little clue to development's size. But common room looks like an afterthought, its heavy-handed window detailing contrasting with





outside. This allows the tenant a degree of flexibility and choice, and from previous studies in this field (Lipman), such provision in housing for the elderly is known to be of considerable importance. It is essential to avoid regimentation so that the tenants are free to accept and enjoy their new environment. Old people must feel free to come and go, unobserved by their neighbours, if they are to maintain their independence and self-respect.

Intelligent use has been made of the remaining space on the site and its form, while not unduly casual, has not been overdesigned. The rear of the building backs on to a fairly high wall, and here two areas have been provided for tenants to sit out 10. Unfortunately, the two high walls make these areas very shady, so they have not proved as popular as was hoped. Perhaps their relative remoteness from the common room has also contributed to their unpopularity. People tend to be reluctant to take furniture from their flats—especially as no attempt has been made to facilitate access to these areas. One or two fixed garden seats would help to solve this problem.

Landscaping on this compact site is informal but adequate. Small plots of land are available for tenants to cultivate if they wish, and the few who do so get a lot of pleasure from it. The use of trees on the Boundary Road side of the development is particularly successful and, when fully grown, they should help to break up the rather austere massing of the building.



G Typical upper floor flat plan

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Circulation

There is no 'ceremonial' entrance to the building and the main entrance (p1199) is articulated not so much by a change in scale as by the treatment of the paving. The only concession to formalism is a fairly restrained piece of sculptured concrete bearing the words 'Southfield House'.

On entering the scheme one gets little feeling of being inside a building, and views of the back garden are seen 6 even before the first staircase is reached. When turning right, the circulation route is punctuated by a series of courtyards and covered ways leading to the remaining three staircases 7.

It is possible during this walk to remain entirely under cover, though it is purely 'head' cover and does not prevent the wind and rain from affecting the footpaths. Straight ahead, through a narrow 'close', one can make out the traffic on Victoria Street—once again the feeling of excessive enclosure that can be created by such small internal courtyards has been avoided 7.

The courtyards are simply treated with non-slip concrete footpaths and three-inch granite chippings, augmented by selected planting in circular concrete boxes 8. Less pleasing is the fact that these restricted and visually 'passive' courtyards form the main living room outlook of two ground floor flats 13. This is unsatisfactory for two reasons: first it does not satisfy ministry requirements for '... a lively and interesting view from the window'³, and second, it permits little privacy within the living room because a low sill, an advantage in most other situations, allows a clear and uninterrupted view inside.

Although we were told that this did not appear to upset present occupiers, it is significant that these two flats and all the others with main views to the rear were the last to be let. It seems clear that this is not a desirable situation and especially so in this scheme where the courtyards are small and the eye of a passer-by is naturally drawn to the only source of activity **9**.

Access to each flat is defined by means of a small porch with a cupboard containing the electricity meters and rubbish disposal bag. This private entrance is appreciated by most of the residents and is further evidence of the care and consideration which have gone into the design of this scheme 11. The staircases are fully enclosed by translucent glass fibre corrugated sheeting which admits considerable light 12. This was a late substitute, for cost reasons; the architect had originally intended to use patent glazing. Had this been used, criticism of the staircase and landings ventilation could have been avoided.

The criticism certainly appears to be justified, and a more satisfactory solution from the tenants' point of view would have been glazing down to sill height (say three feet from the floor), with a solid or opaque panel below down to the floor. The tenants would then have been able to use the landings without feeling they were being watched.

The occupant has literally taken over the landing outside one of the two second-floor flats by laying down a full carpet, furnishing it and even fixing a small gate to the top of the stairs. (It is indicative of the relaxed supervision of this scheme that the gate was fixed, by the warden, at the resident's request.) So the landing has become a sun terrace, the main drawback being that the opaque cladding shuts out













the view.

In general, the circulation areas are well conceived, on a scale which is always appropriate to the function of the building. They are equipped with an unobtrusive lighting system, which is controlled in a relaxed manner by the warden. The freestanding light posts in the garden are appreciated and form a highly effective link between inside and outside.

Finishes on the staircase and landing and in the corridors indicate economies, and the veneered plywood casing surrounding the heating ducts in the covered ways has warped and stained most unattractively. The concrete surfaces of the stairs and landing have cracked rather badly and a ceramic tiled finish would probably have been a better choice. The staircases have sturdy handrails on both sides, although such deep rails tend to be more difficult to hold firmly than the traditional round section. A lower rail might also have been desirable from the point of view of modesty as well as safety **12**.

The flats

Each individual flat layout is basically the same, except for a slight difference in some ground floor flats where the bedroom is angled in an L-shape to the rest of the unit. Areas exceed minimum Parker Morris standards and the disposition of rooms is compact and well planned. One tenant did make the point that the kitchen in which she spends a considerable amount of time is rather remote from the front door, and she would have preferred a less circuitous means of access. This is a common criticism, and was voiced in the Hanover survey⁴ wherever such a situation occurred. The greatest degree of satisfaction is obtained where each room opens onto a common entrance hall. This would have inevitably required more floor area, with a corresponding increase in price. Otherwise, the flats seem very popular and there was little substantial criticism. Perhaps one significant fact here is that only seven of the two-person flats are actually occupied by two people-in each case a married couple.

There could be several reasons for this, such as the obvious one that the pattern of life expectancy invariably dictates that schemes like this are occupied mainly by widows and spinsters. Perhaps another reason is that although the bedrooms are large enough to accommodate two people, it is not uncommon for couples at this stage of life to prefer single beds and, as age increases, single rooms 14.

Although the provision of two-bedroom accommodation for the elderly is not precluded under the current subsidy system, it is not exactly encouraged, and we would be interested to see a scheme built which provided a wider range of accommodation sizes. A combination of say six

5 Turning right upon entering, along covered way towards two enclosed courts
6 Passing through main entrance itself, this view comes as surprise, for building loses all pretence of homogeneity.

Main sitting-out area at back 7 Farther along covered way is second courtyard. Views out have been used to break up feeling of single building. Victoria Street straight through

8 First courtyard, looking back, shows paving treatment, concrete planting boxes and night light fixed low on wall. Note uninspired view from ground-floor flat on right bedsitters, six two-bedroom and 16 one-bedroom (twoperson) flats might have been provided in this case, at little extra cost, with little inconvenience to the single tenants, and at considerable added convenience to the couples.

It is unlikely that the substitution of bedsitters for some one-bedroom flats would have proved significantly unpopular* and the lower rents might even have made it easier to accommodate those in great need. Similarly, the couples would most likely be in the best position to afford a slightly higher rent while being glad of the extra benefits.

The size and shape of the living room is ideally suited to the varying demands of tenants' furniture arrangements. The bay window has a deep ledge, intended as a window seat but more often and more satisfactorily used as a shelf for potted plants. The sill is low and allows comfortable views from an armchair in most positions.

The kitchen is rather small but thoughtfully planned and, by avoiding excessively high and low storage areas, shows an awareness of the problems such normally acceptable fittings pose for the elderly 15. A pull-out shelf is provided for those who wish to eat in the kitchen (which the warden said most tenants did), and a fridge and cooker are standard equipment. Compensating for the unusual positioning of the sink unit on an internal wall, a strip light runs along the underside of the cupboards above.

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Bathrooms are all internal and therefore artificially ventilated, but this did not appear to concern the tenants unduly 16. There did seem to be some obvious omissions in the bathroom equipment, such as provision of a non-slip bottomed bathtub, some form of grip on the left-hand side of the bath for the other hand to grasp and, most surprisingly, an overflow in the bathtub. It is not only remarkable that this last item should be omitted in a development specially designed for the elderly, but more so that baths should be made like this at all. It would be just as dangerous in a house with several children as in one with an elderly tenant, and we hope that architects reading this will take note and act accordingly.

The heating system is hot-blown air, circulated by ducts through each flat and operated from a central boiler room opposite the laundry room on the ground floor. Tenants control the temperature individually by a thermostat fixed to the wall in the living room. The boiler is oil fired and refuelling is done by tanker at a remote valve on the other side of Boundary Road, in a layby provided for the purpose. The tenants seem extremely happy with this system, as it is infinitely flexible, being on all the time (including summer), and because the cost is included in their rent. This was in complete contrast to Hanover tenants' response to hotblown air systems, which were the least popular of all systems used at Hanover schemes⁴. However, in all these cases the boiler was of the individual unit type, sometimes

see New housing for the elderly: 'Two-fifths of the two-person households . . . would have been willing to pay a higher rent for two-bedroomed accommodation. . . About one-third of the tenants living alone said they would have considered a bedsitter.' (p54)

9 Second entrance from Boundary Road. It would tax anyone's ingenuity to achieve privacy in ground floor flat of second court, opposite

10 Second sitting-out area. Perimeter wall is immediately right and nearly all available 11 Upper landing. Glass fibre cladding is not popular and it is proposed to install windows for ventilation. Note privacy of entrance to flats. Door facing is meter/rubbish closet









gas, sometimes electricity, which suggests that we were recording mistrust of the boiler rather than criticism of the *means* of heating.

Fittings supplied in the flats at Southfield House are, in general, beyond criticism. There are more than ample electric outlets at a reasonable height off the floor, the light switches are well placed, door handles are of the lever type, ideal for arthritic fingers, and the window-opening device offers no problems whatsoever.

An effective two-way radio enables the warden to page individual tenants and hold a conversation with them. This, although it might be considered intrusive, was highly thought of by the tenants who appear to appreciate the extra feeling of security it gives them.

Communal facilities

The scheme has an attractive common room, part of which is used for serving midday meals three days a week. These cost 30p each and are regularly taken by 18 to 20 tenants. The meals are prepared in an excellent kitchen **19** next door, and the warden often makes tea for people using the common room in the evenings.

The common room is very pleasant indeed **18** and fully equipped with attractive modern furniture, comfortable armchairs, a colour television (donated by a local electrical retailer), a stereo record player (belonging to the warden but available for tenants' use) and a piano. The room is used regularly by about eight to ten people (although rarely by any of the married couples) and is hardly ever empty. It seems that this room works so well partly because of its attractive design and equipment, partly because of its central location in relation to the flats, but chiefly because the wardens, both husband and wife, are prepared to give their time to ensure that it is an enjoyable place to go.

The laundry room is located directly in front of the main entrance, and there is a small open area at the back which can be used for drying, although the warden convinced us that the equipment dried clothes adequately without resorting to outside clothes-lines. The room is used by about 13 people weekly and this is proving excessive for the largely domestic equipment, used free of charge.

Tenants

The majority of the flats are occupied by people living on their own. Only a fifth are inhabited by couples, compared with over a third of the Hanover Housing Association's accommodation⁴. In age structure, on the other hand, the Southfield House community is similar to Hanover, with less than 10 per cent aged 80 or over. Local authority sheltered housing, by contrast, tends to have a rather older population, possibly because of selection policies.

It should be mentioned that most of the Southfield House tenants are active and well able to continue leading reason-

12 Typical stair detail.
Chunky handrail hard to grip and too close to wall on left. Absence of mid rail may be criticised. Cracking has begun on upper landing
13 From 'internal' living room—with a view like this, he is probably better off with his paper!

14 Bedroom, looking very crowded with two single beds15 Kitchen with work

cupboards in highest position; lowest are about Sin from floor (cooker shown belongs to tenant) **16** Internal bathroom is compact but adequate. Note omission of grab rail on left of bath, and no overflow. Shelf rather inaccessible **17** Common room with television area to right, 'listening' area in window bay (windows are double









18 Well-equipped kitchen where midday meals are prepared three days a week

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ably independent lives with the limited assistance offered by the scheme. Shopping, for example, is made easier by frequent calls by mobile shops, and hairdressing and chiropody services are laid on regularly.

At the moment only one of the tenants is housebound, and with the assistance of the warden and a home help, she is able to manage on her own here more easily than would have been possible in normal housing. This is clearly where the advantages of sheltered housing can best be seen, and although such schemes would become unmanageable if a large proportion of tenants needed constant support from the warden, it is plain that provided the housebound are in the minority, sheltered housing allows them to live a relatively normal life—impossible in either residential home or hospital. At present only seven of the 27 tenants have home helps.

Most of the tenants are local people or have relatives living locally. Age and the ability to look after themselves were the only criteria for eligibility, and the group is said to be fairly mixed socially. Rents are £34 per calendar month, inclusive of rates, central heating and hot water, but as the Supplementary Benefits Commission is now expected to regard housing association rents as 'reasonable', with respect to payment of rent allowances, low income need not debar people from such schemes. However, unlike the tenants of the Hanover Housing Association and Help the Aged, none of the tenants at Southfield House appeared to be wholly dependent on state pensions and benefits.

Conclusion

This scheme sets new standards for self-contained accommodation for the elderly. The architect has designed an unpretentious building which allows the tenants a considerable amount of privacy yet at the same time enables an admittedly excellent warden to foster an easy and relaxed atmosphere. Tenants can choose to live as independently as they wish, in the full knowledge that assistance is available when required, and it is in its contribution to this need that the scheme scores highest.

It is also to the architect's credit that not only does the design satisfy these rigorous social criteria, but the building itself is of considerable merit and an asset to its surround-

REFERENCES

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2 Accommodation for old people: two schemes in Norwich. AJ 1970, 28 January, p221-232 [843]

3 MINISTRY OF HOUSING AND LOCAL GOVERNMENT Circular 82/69 Housing standards and costs, accommodation specially designed for old people. HMSO [843 (A4j)] Welsh office circular 84/69

4 PAGE, D. and MUIR, T. New housing for the elderly. 1971, Bedford Square Press. [843]. A report on the location, layout and design of housing provided by the Hanover Housing Association. Available from the National Council of Social Service, 26 Bedford Square, London WC1

SUMMARY

Ground floor area: 10 190 sq ft (946.68 m²). Net habitable floor area: 16 818 sq ft Gross floor area: 19 170 sq ft Type of contract: Fixed price, RIBA (Private edition with quantities). Tender date: August 1969. Work began: November 1969. Work finished: December 1970 Price of foundation, superstructure, installation and finishes including drainage to collecting manhole: £79 940.87. Price of external works and ancillary buildings including drainage beyond collecting manhole: £7483.80. Total: £87 424.67.

COST ANALYSIS

	Cost
Based on tender	per sq ft
Preliminaries and insurances $4 \cdot 90$ per cent of remainder of contract.	£ 0-24
Contingencies $2 \cdot 88$ per cent of remainder of contract.	0.15

Work below lowest floor finish 0.24 11 in hollow walls in Lincoln common bricks with 25 in Lincoln Tudor red facings above ground level on concrete strip foundations; 4 in concrete slab with 1000 gauge polythene sheet membrane on 9 in hardcore bed; 7 in site strip; 15 stanchion bases for staircase cladding framework (£25 for pumping below water level).

STRUCTURAL ELEMENTS

Upper floors

Pc beam and infiller block floors plus battens: 891 sq yd, $\pounds 2 \cdot 99$ per sq yd ($\pounds 3 \cdot 58/m^2$).

Plain steel girders to cantilevered portion of first and second floors.

Roof

Flat roof. Timber joists $\frac{1}{4}$ in particle boarding; firrings; 2in glass fibre quilt; three layers built up felt roofing (glass fibre base); 18 swg aluminium flashings and edge trim; pvc gutters and down pipes: 1140 sq yd, £4.87 per sq yd (£5.82/m²).

Rooflights

Opal acrylic exterior domes; hit and miss shutters: 4 sq yd, $\pm 57 \cdot 28$ per sq yd ($\pm 68 \cdot 51/m^2$).

Staircases

Prime cost sum for timber stairs, landing and finishes, timber handrails:

0.20

0.33

0.01

0.21

Total rise Width overall tread 3 timber Sft 6in 3ft 3in 2 do 17ft 3ft 3in

External walls

 $10\frac{1}{2}$ in hollow walls; $2\frac{5}{3}$ in Lincoln Tudor red facings in outer skin; 4in lightweight concrete block inner skin; 2in cavity: 2227 sq yd, $\pounds 3 \cdot 67$ per sq yd ($\pounds 4 \cdot 50/m^2$).

15in do: 57 sq yd, £5.04 per sq yd (£6.03/m²).

Translucent glass fibre reinforced sheeting on steel framing around staircases: 247 sq yd, £4·32 per sq yd (£5·17/m²).

Windows

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Timber casements, 72 per cent standard, 28 per cent special. Standard modified BSS: 1709 sq ft, ± 0.96 per sq ft ($\pm 10.50/m^2$). Projecting cantilevered bay windows: 629 sq ft, £1.42 per sq ft (£15.60/m²).

Clear sheet glazing; polished plate glass to staircase windows.

External doors

2in two-panelled softwood: 56 sq ft, $\pounds 1 \cdot 46$ per sq ft ($\pounds 15 \cdot 71/m^2$). 13in: 540 sq ft, $\pounds 0.74$ per sq ft ($\pounds 7.96/m^2$). 1³/₄in 2ft \times 6ft 6in: 351 sq ft, £0.62 per sq ft (£6.67/m²). No of single doors: 56. No of double doors: 2.

Internal structural walls

10in hollow walls; 2in cavity; two 4in block skins: 171 sq yd, $\pounds 2 \cdot 08$ per sq yd ($\pounds 2 \cdot 49/m^2$).

Partitions

3in block: 1220 sq yd, $\pounds 0.78$ per sq yd ($\pounds 0.93/m^2$). 4in do: 58 sq yd, $\pounds 1 \cdot 02$ per sq yd ($\pounds 1 \cdot 22/m^2$). 6in do: 189 sq yd, $\pounds 1 \cdot 45$ per sq yd ($\pounds 1 \cdot 73/m^2$).

Internal doors

 l_4^3 in flush with storey height plain panels over, generally. Some glazed doors.

2in two-panel softwood: 18 sq ft, $\pounds 1 \cdot 10$ per sq ft ($\pounds 11 \cdot 84/m^2$). l $\frac{3}{4}$ in door: 540 sq ft, £0.68 per sq ft (£7.32/m²).

l3in do: 2ft 6in \times 6ft 6in: 520 sq ft, £0.42 per sq ft (£4.52/m²). $1\frac{3}{8}\text{in}$ do: 2ft 9in \times 6ft 6in: 1602 sq ft, £0 · 44 per sq ft (£4 · 73/m²). $1\frac{3}{4}$ in do: 18 sq ft, £0.52 per sq ft (£5.60/m²).

Ironmongery

Prime cost sum £650 for supply of satin anodised aluminium ironmongery; fixing £469. Curtain tract £5.50 per flat. Sliding door gear £2.12 per 2ft 6in-wide door including fittings.

FINISHES AND FITTINGS

Wall finishes

Two coats $\frac{1}{2}$ in plaster: 4244 sq yd, $\pounds 0 \cdot 50$ per sq yd ($\pounds 0 \cdot 60/m^2$). $\frac{1}{2}$ in expanded metal angle beads: £0.11 per yd. Plaster stops: £0.14 per vd. 6in \times 6in white glazed tiling 6in wide over fittings: £1.35 per yd.

Floor finishes

Cement and sand screeds generally; ¹/₂in glass fibre under screeds to first floor; thermoplastic tiles (prime cost sum); granolithic; cork tiles; terrazzo tiles to communal areas. $2\frac{1}{4}$ in (av) cement and sand pavings: 100 sq yd, £0.47 per sq yd $(\pounds 0 \cdot 56/m^2).$

2in granolithic paving: 149 sq yd, $\pounds 0.72$ per sq yd ($\pounds 0.86/m^2$). 9
in \times 9
in \times $\frac{7}{3}$ in terrazzo tiles: 19 sq yd, £2.89 per sq yd $(£3 \cdot 46/m^2).$

12in \times 12in \times $\frac{3}{4}$ in cork tiles: 96 sq yd, £2 \cdot 12 per sq yd $(\pounds 2 \cdot 54/m^2).$

 $2\frac{1}{4}$ in (av) cement and sand screed (for thermoplastic tiles): 1546 sq yd, ± 0.44 per sq yd ($\pm 0.53/m^2$).

Ceiling finishes

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 $\frac{3}{8}$ in plasterboard and skim to timber: 870 sq yd, ± 0.50 per sq yd ($\pm 0.60/m^2$).

 $\frac{3}{4}$ in matchboarding to communal area: 299 sq yd, £1.20 per sq yd (£1·44/m²).

Two coats bonding and one coat finish on concrete $(\frac{5}{8}in)$: 643 sq yd, £0.74 per sq yd (£0.88/m²).

Decoration

£

0.59

0.15

0.04

0.31

0.09

0.07

0.10

0.17

0.09

£ 0.14

0.32

0.16

0.05

0.03

Two coats vinyl paint on walls and ceilings generally; three coats gloss finish on internal and external woodwork; stain and two coats of varnish on matchboarded ceilings; small amount of wood preservative to frames.

Fittings

Softwood shelving: £86.19.

56 11 in dia beech grab rails: £62.60 total cost. Vertical ducts to each flat in timber framing covered with melamine-faced chipboard: £21.90 per flat. Timber cupboard fronts and doors (138 at £7.20 each); 31 mirrors £44.00.

Prime cost sums, joinery and kitchen fittings: £3828.

SERVICES

Sanitary appliances

Type	37.
$2 \sin \times 17$ in vitreous china washbasin	No
	30
Vitreous china wc suite	31
$20 { m in} imes 15 { m in} imes 9 { m in}$ stainless steel bucket sink	1
$16 ext{in} imes 12 ext{in} imes 26 ext{in}$ vitreous china urinal	1
42in $ imes 2$ lin stainless steel sink top	28
$60 { m in} imes 28 { m in}$ perspex bath	28
Vitreous china hand-rinse basin	2

Waste, soil and overflow pipes

High temperature pvc waste pipework with solvent welded fittings; polypropylene traps. Pvc pipes and fittings in overflow.

Cold water services

Copper pipes and fittings to each flatlet. Work to communal area included in prime cost sum for heating and engineering services. Storage capacity of tanks: 25 gal. No of cold draw-off points: 150. Builder's work: 1p.

Hot water services

0.10 Copper pipes and fittings: combination cylinder and tank (£39.95 each) lagged to each flatlet boiler, calorifier and pipework to communal area included in prime cost sum for heating and engineering services. No of hot draw-off points: 84. Builder's work: 1p.

Heating services

0.61 Oil-fired warm air heaters to each flat, fuel from communal tank.

Detailed costs not available.

Prime cost sum in tender based on competitive lump sum quotations.

Ventilation services

4in pvc vent pipes and fittings and double inlet extractor.

Electrical services

Pvc cables and wiring; pvc conduit. Builder's work: 2p. Total no of lighting outlets: 331. Total no of power outlets: 301. Total electrical load in kW: 300.

Special services

Fire-fighting appliances: £239.94.

0.23

0.06

0.17

Alarm system and intercommunication system: £940. Builder's work: 2p.

Drainage

Drain trenches up to 6ft total depth; cast iron pipes for soil drains; salt-glazed stoneware pipes for surface water; 19 brick manholes at $\pounds 24 \cdot 32$ each (average 3ft deep); 7 soakways at $\pounds 10$ each.

£

0.07

4.75

0.45

Total per sq ft of net habitable floor area

£799 40.87 (net cost excluding external works)

16 818 sq ft (net habitable area)

Cost per sq ft of gross floor area

£79 940.87 (net cost excluding external works) 19 170 sq ft (gross floor area)

External works

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Covered ways (603 sq ft): $\pounds762 \cdot 49$; removing trees, landscaping; pc paving slabs on hardcore and ashes (404 sq yd, $\pounds0 \cdot 95$ per sq yd, $\pounds1 \cdot 14/m^2$); boundary walls in salvaged bricks from demolitions and repointing existing walls; water main (4in spun cast iron pipes, 60 yd, $\pounds3 \cdot 40$ per yd); water service (copper pipes); foundations to oil tank, external ducts for services; car park and car port $\pounds1510 \cdot 14$; boundary road $\pounds1888 \cdot 91$; grass seeding $\pounds200$; demolition $\pounds233 \cdot 61$.

SUMMARY OF ELEMENTAL COSTS

	Cost per sq ft £	Cost per m² £	Per cent of total
Contingencies	0.15	1.57	3.07
Nork below lowest floor finish	0.24	2 . 56	5.01
Structural elements			
Upper floors	0.20	2.20	4.29
Roof	0.33	3.55	6.94
Rooflights	0.01	0.15	0.29
Staircases	0.21	2.26	4.42
External walls	0.59	6.37	12.46
Windows	0.15	1.66	3.24
External doors	0.04	0.39	0.76
Internal structural walls	0.03	0.33	0.65
Partitions	0.09	0.93	1.81
Internal doors	0.07	0.78	1.51
Ironmongery	0.10	1.10	2.15
Total of structural elements	1.33	19 ·71	38 . 52
Finishes and fittings			and the second
Wall finishes	0.17	1.86	3.64
Floor finishes	0.09	1.00	1.96
Ceiling finishes	0.09	0.93	1.81
Decoration	0.14	1.54	3.01
Fittings	0.32	3.40	6.65
Total of finishes and fittings	0.81	8.73	17.06
Services			
Sanitary appliances	0.16	1.71	3.35
Waste, soil and overflow pipes	0.05	0.51	0.99
Cold water services	0.03	0.33	0.65
Hot water services	0.10	1.07	2.08
Heating services	0.61	6.57	12.83
Ventilation services	0.06	0.67	1.30
Electrical services	0.17	1.81	3.53
Special services	0.23	2.51	4.90
Drainage	0.08	0.81	1.58
Total of services	1 · 48	15.97	31 .22
Total	4.75	51 ·16	100.00
External works	0.45	4.79	

COST COMMENT

An interesting scheme designed and built to the (former) MHLG cost yardstick is an infrequent achievement in these days of escalating costs. The fixed price tender was obtained in August 1969 and the contract, completed in one year and wholly in traditional materials and construction, posed no undue problems in forecasting increased costs.

unusual grouping might appear extravagant; but loadbearing brickwork with short span floors and roof joists minimised the effect of a large perimeter with many re-entrants. Consider the cost implications of the following elements:

a Upper floor construction in concrete planks at $\pounds 2.99$ per sq yd ($\pounds 3.58/m^2$).

b Roof joists covered with $\frac{3}{4}$ in thickness particle boarding and three layers, felt with simple perimeter detailing—all in rate $\pounds 4 \cdot 87$ per sq yd ($\pounds 5 \cdot 82/m^2$).

c External walls are loadbearing brick at ± 3.67 per sq yd $(\pm 4.50/\text{m}^2)$ although designed to high wall/floor ratio of 1.07:1; plus a further 0.11:1 for the translucent glass fibre sheeting at ± 4.32 per sq yd $(\pm 5.17/\text{m}^2)$.

d Internal structural walls and partitions, again with combined **4.17** wall/floor ratio of 0.77, are at unit rates ranging from ± 0.78 per sq yd ($\pm 0.93/m^2$) to ± 2.08 per sq yd ($\pm 2.49/m^2$).

These elements show real economy—admittedly carried out in, at that time, a low cost building area—and would still be an economic approach today.

Windows are also economic with total combined window/floor ratio of 0.12:1 using standard modified timber casements at ± 0.96 per sq ft ($\pm 10.50/m^2$) and the special bay windows at ± 1.42 per sq ft ($\pm 15.50/m^2$).

As for finishes, wall surfaces are fairfaced brickwork, or plastered and painted. Ceilings are plasterboard and skim $\pounds 0.50$ per sq yd $(\pounds 0.60/m^2)$ to underside of roof joists and plaster $\pounds 0.74$ per sq yd $(\pounds 0.88/m^2)$ direct to underside of concrete floor. A touch of glamour appears in the communal lounge with $\frac{3}{4}$ in metal boarding at $\pounds 1.20$ per sq yd $(\pounds 1.44/m^2)$ —a satisfactory relief at low cost.

Services, all-important in a building used 24 hours a day, show heating at $12 \cdot 83$ per cent of the total cost as the most expensive element. Some of the other special services are also worth noting: alarm and communication system at £940, and cooker, refrigerator and laundry equipment at £2150. These fittings, with fitted furniture totalling £6134, account for £143 per occupant.

External works, at 9.3 per cent of building cost, include two major items: £1888 for work to Boundary Road, and car parking and carport £1510. The covered walks, an essential design concept, are costed at £762 for 603 sq ft.

The scheme can be summarised in terms of the 58 total occupants: gross area per occupant, 330 sq ft; net cost per occupant, $\pounds1378$; gross cost per occupant, $\pounds1407$.

CONTRACTORS

Main contractor: C. C. Stafford Ltd. Nominated subcontractors and suppliers: heating: Field Associates. Electrical installation: Wood and Metcalfe Ltd. Concrete floors and stairs: T. C. Campbell Ltd. Steelwork: Flint and Bates Ltd. Built-in fittings: Gaskell & Chambers Ltd. Television relay: Television Installation Services. Intercommunications: Radio Rentals Wired Systems Ltd. Cookers and refrigerators: East Midland Electricity Board. Kitchen installation: Smethursts Foods Ltd. Ironmongery: Lewis & Grundy Ltd. Laundry equipment: Peak Electrical Distributors Ltd. Landscaping: Charles Lawrence Ltd. Furnishings: E. Holden & Son (Newark) Ltd, Raymond Lillie, D. A. Clark & Son Ltd. Signs: Derby Signs Ltd.

PHOTOGRAPHS

All photos by Keith Gibson