

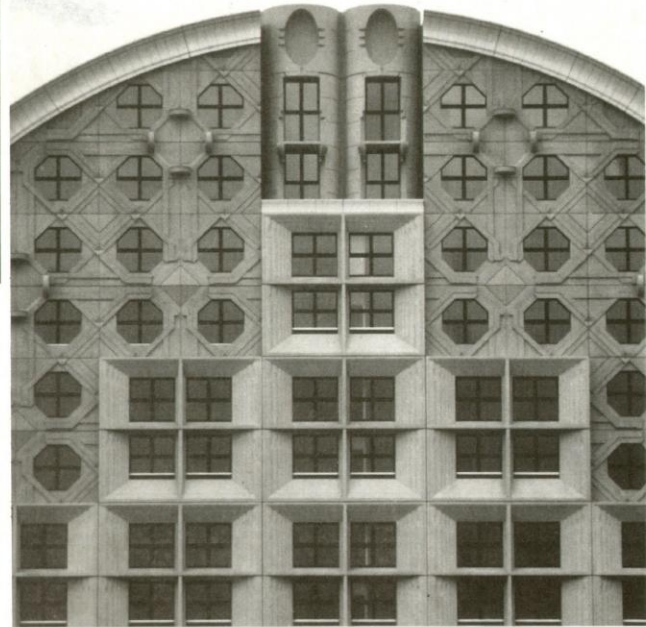


PRECAST CONCRETE SYSTEMS BREAK THE MOULD

LANDSCAPE REVISIT 2

THE ARCHITECTS' JOURNAL/11 DECEMBER 1985/90P

BUILDING FEATURE



1 A section of Manolo Nunez's public housing scheme, Les Arènes de Picasso, at the French new town of Marne-la-Vallée. With 250 mould variants, 5000 tons of concrete, this scheme demonstrates the level of sophistication reached by concrete panel systems in France. 2 (facing page) The conventional hollow moulded panel type was used in reverse so that the depth of the void could be modelled to achieve sculptural and linear relief.

BREAKING OUT OF THE MOULD

It isn't just the dust that wouldn't settle at Hackney's Trowbridge estate. Prefabricated concrete housing systems, it seems, will haunt the profession for a long time to come. But one might well ask why British architects have so completely turned their backs on such a construction material and method. Is their judgment clouded by the ghost that haunts them?

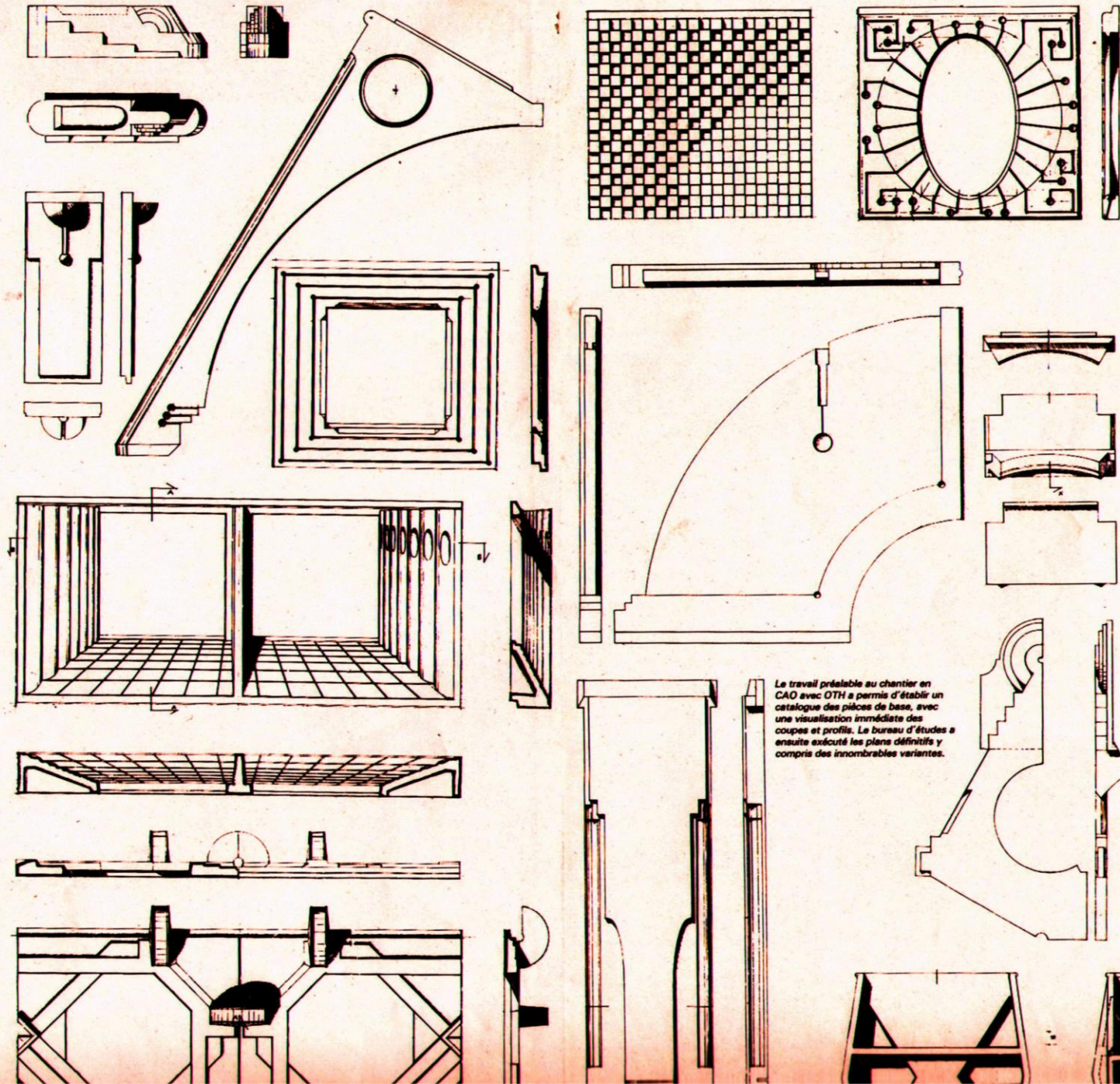
France in contrast has consistently developed such methods over the past decade. In one sense it would seem their continuous development has been of benefit.

Many British architects will remember the economic arguments made for restricting the number of mould variations and thus panel patterns and form. They and the public have regretted the drab end result ever since. So how do architect Manolo Nunez-Yanowsky and the contractor I. B. Morin produce Les Arènes de Picasso, a public budget rented housing scheme in Marne-la-Vallée?

Our coverage of this scheme should not be taken as condoning such a housing solution, our focus is more about a method of building. Martin Meade describes the project, and two commentators from the Cement and Concrete Association (pp36, 37) put it into a British perspective.

Photographs:
1, 3, 22, 23 Patrick Hannay; 2, 5, 19,
20, 21 Deidi von Schaeuwen; 10, 12
Gérard Guillat; 11, 13, 15 F. Buxin.
Courtesy of Moniteur.

la préfabrication comme art



DOUBLE PANEL, ELEVATION AND PLAN

COLUMN BASE IN PLAN, SIDE AND FRONT ELEVATIONS

Le travail préalable au chantier en CAO avec OTH a permis d'établir un catalogue des pièces de base, avec une visualisation immédiate des coupes et profils. Le bureau d'études a ensuite exécuté les plans définitifs y compris des innombrables variantes.

Photos: Dwidl von Schaefer

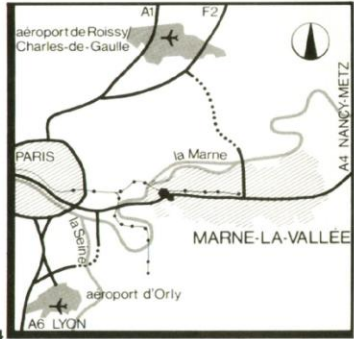
(+0, +3, +5) indicating the direction and rise of a given plane. Curved pieces, like the cornice of the great disk, are located and sized mathematically by means of angles and radii. The pieces themselves are held in place by means of metal studs or plates, the latter attached to the panel by means of embedded pins. The metal connections are soldered together, then covered in a cement mortar.

MARTIN MEADE

The French government's post-war rationalisation of the building materials and construction industries has made the use of in-situ and precast concrete the norm in France. Despite the restrictions of the current economic climate, public sector works and in particular public housing (combining rented and subsidised mortgage schemes) remain a platform of the socialist government programme and, at least in the new towns, developments of over 100 units are still being built.

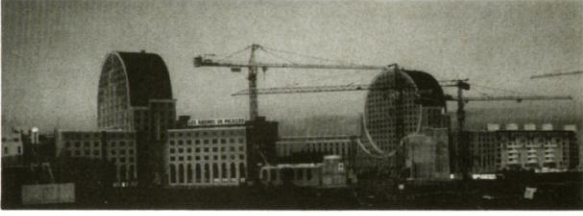
The new town of Marne-la-Vallée, on the eastern edge of Paris, is a case in point. The town centre at Noisy-le-Grand has a typical selection of high- and medium-rise blocks of the past 10 years, 6, all of cross or longitudinal loadbearing construction in precast and in-situ concrete with the standard range of fair faced, rendered, painted or tiled finishes. Consistent development of precast cladding panel types and the perfected use of slip form techniques easily have accommodated, as much as they have induced, the cut-out, plasticised forms that characterise so much of contemporary French architecture.

That French precast panel systems are capable of providing more than monotonous and frequently shoddy uniformity already has been strikingly proven at Noisy-le-Grand by the gigantic precast classical garb of Bofill and the Taller d'Arquitectura's Palacio d'AbraXas, 6, rearing its 19 storeys over the town centre (AJ 10.8.83 and AR March 1982). If this were not 'spectacular' enough it now has been challenged by Les Arènes de Picasso, 5, a vast circus between the town centre and the A3 motorway, around which Manolo Nunez-Yanowsky (Bofill's compatriot, former Taller partner and now a rival in showmanship) has designed a council housing complex encircled by raked arcades and dominated in the vertical plane by two giant Camembert-like blocks set on their edges, 5, 8, 9. The fantastical vocabulary and symbolism

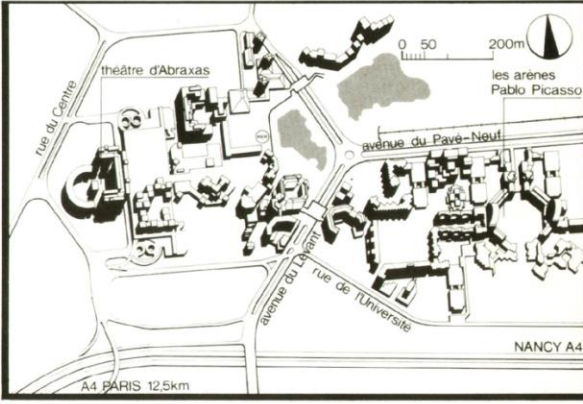


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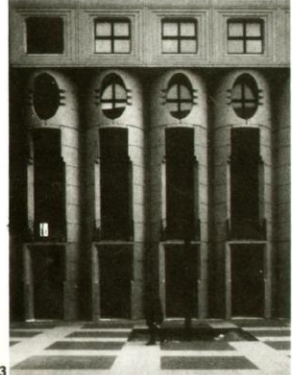
3 Only in the outer wings with their 'rounded' turrets flanking the main approaches to the discs, are panels loadbearing.
4 The new town of Marne-la-Vallée is only 20 minutes from Paris. Les Arènes de Picasso is in the commercial centre of Noisy-le-Grand, at the western edge of the town (see 6).
5 Two giant Camembert-like blocks set on end. Manolo Nunez's answer to the town planners' brief of two stepped section 17-storey buildings on an east-west axis linked by an arcade around an arena.
6 Noisy-le-Grand, the commercial centre. Bofill in the west and Nunez in the east.
7 Ground level plan of the site.



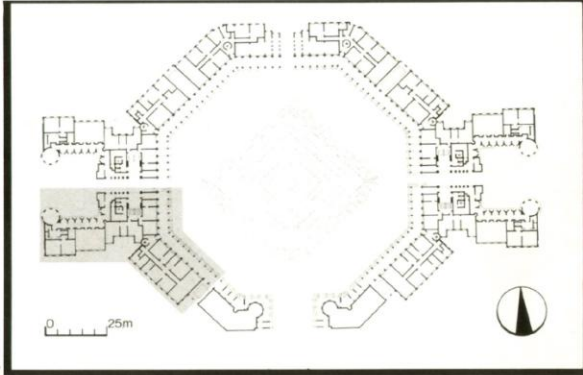
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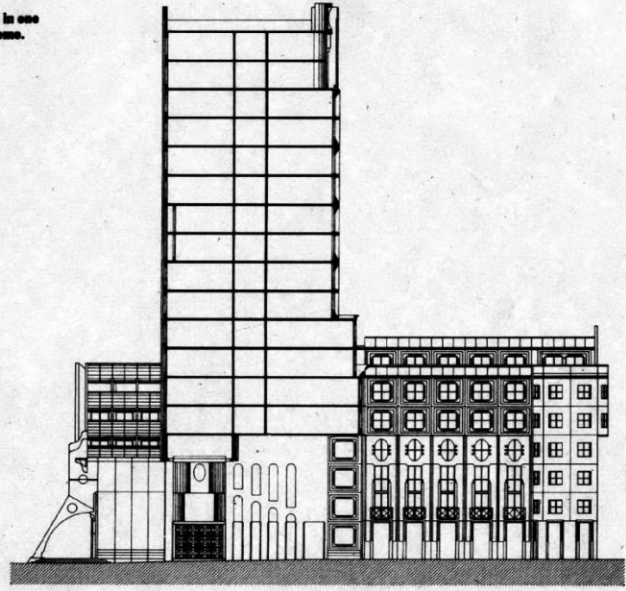


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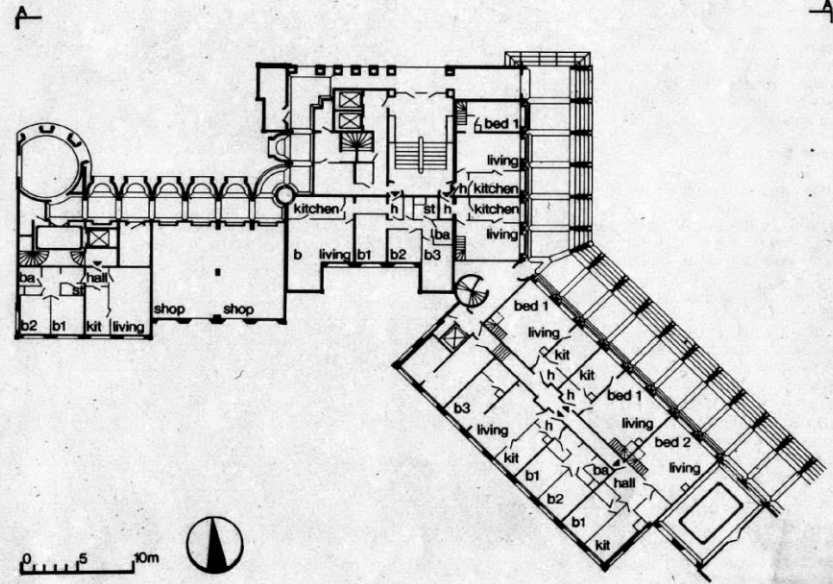
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8 Section-elevation through one of the tall blocks.
9 Typical flats plans in one quadrant of the scheme.



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SECTION/ELEVATION AA



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SECTION

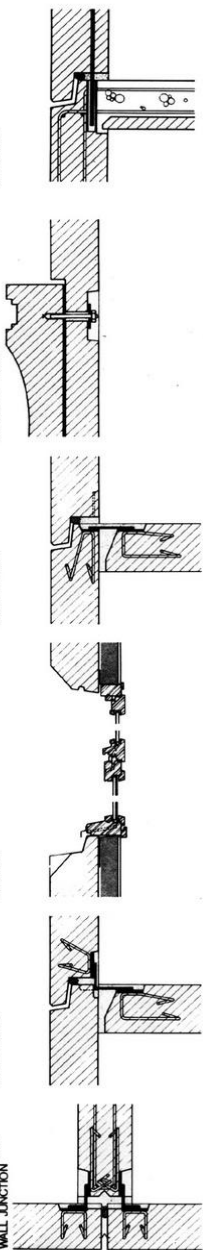
CORNICIE FIXING

PANEL HEAD

WINDOW

PANEL FOOT

PANEL/STRUCTURAL WALL JOINTION



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sublimation of great French architecture themes: pure neo-classical spheroid geometry of Boullée and Ledoux, the rose windows of the Gothic cathedrals of the Île de France region, the vast fanlights of nineteenth century Parisian railway termini, or, as Charles Jencks has it, a blend of Piranesi and a computer console (quite apart from more Hispanic references to Moorish decoration, Gaudiesque forms and perhaps a tongue-in-cheek honeycomb/housing parallel).

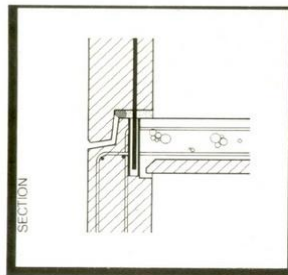
The developer's immediate reaction was, not surprisingly, sceptical on the grounds of cost. Nunez, however, produced a practical rationale for his 'visionary' proposal. He argued that the discs offered the same amount of accommodation and by reducing the extent of the facade and roof areas of the stepped alternative they would cost out at no more than the latter. The inevitable curvature of walls and ceilings in the uppermost flats was, he disingenuously suggested, no different from the traditional (and by implication familiar and fashionable) curved Parisian mansard typified by the rue de Rivoli (with the bonus of heightened acoustic effects for stereo enthusiasts!). Even so, the developer remained dubious until his own bureau d'études (drawing and surveyors office) confirmed to his astonishment (and probably Nunez's) the feasibility of the proposal.

The principle vindicated, Nunez was now faced with the reality of executing

his exuberant 'festival of forms'. Initially he had envisaged using in-situ concrete for the facades as well as the cross wall structure, 12, but it quickly became evident that the complex form work involved would exceed cost limits. Nunez therefore turned to the Franco-Belgian precast concrete manufacturer I. B. Morin, with which he had already worked on his Belgian schemes.

Moulding the budget

Morin, which was also used by Bofill and the Taller for the Palacio d'Abraxas, produces an extensive range of precast panel and construction systems with a wide choice of stone aggregate 'died in the mass' mixes and finishes. Any special design features can be reproduced in the firm's pattern shop from carved



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wood positives providing polyester moulds; for standard runs of 100 components and more, steel moulds are used.

Working closely with Morin's research and technical staff from the beginning, Nunez was able to experiment with different aggregate and cement mixes to obtain the 'liquid stone quality' he wanted. The panel types were evolved in a similar vein. The conventional hollow moulded panel type was used in reverse so that the depth of the void could be modelled to achieve a sculptural and linear relief effect, 17, the idea being to build up a sufficiently bold overall facade pattern to override and obscure the basic panel grid. Special features such as the curved cornice moulding, 13, framing the discs and the raking arcade buttresses with their balcony elements above were provided by the pattern shop.

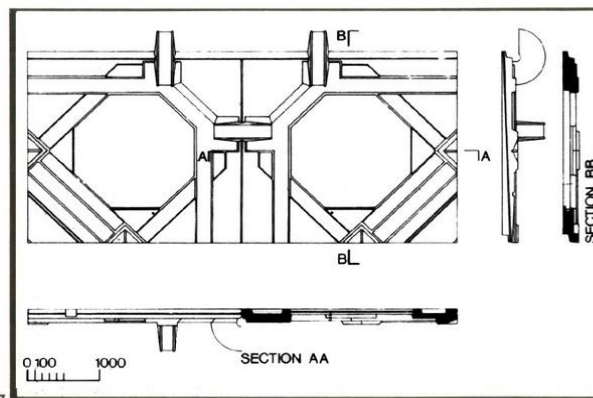
The panels and mouldings are applied as decorative facing to the blind walls of the structure but on the main facades they carry their own weight and brace the cross walls and floors, 14. Only in the outer wings with their rounded 'turrets' flanking the main approaches to the discs are the panels genuinely loadbearing, 3, 16. Nunez was able to work out with Morin the maximum number of different patterned component series he could use within the technical limitations of reinforcement and viable production runs to accomplish his

designs. Forty-nine series were thus developed, providing 250 variants amounting to some 5000 castings and about 8600 tons of concrete.

Fixing and fitting

All the components are designed to take into account ease of delivery, handling and erection on site in maximum overall lengths of 6 metres. Some, such as the curved cornice elements and their associated sections of facade panel are pre-assembled with resin glue and bolted fixings at the works, 13, 15. Depending on pattern type their weight varies between 300 kg and the 7-tonne limit of the crane used to hoist each component into its exact position, cradled in a specially designed protective frame bolted into precast threaded sockets.

The most common method of fixing to the cross walls and floors is by means of embedded steel ties and angle irons, while, depending on their shape and position, the units are secured in the vertical plane by interlocking bedding or tenoned by pins grouted in precast sockets, 14. Weatherproofing is provided by self-draining channels, 15, or gutters incorporated in the precast mouldings, by flashings, profiled PVC joint linings, pointing and, where necessary, impregnated extruded foam seals. The standard French casement window joinery is mounted on the flat rear of the panel, behind the opening, housed in the internal wall

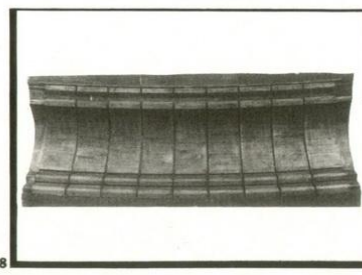


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14 (facing page) Section through typical panels on the non-loadbearing front facade (see 15 for view of front elevation). 15 Panels under assembly, before windows were mounted behind. Note the drainage hole at the bottom of the top hexagon. 16 Section through joints between the loadbearing precast panels.

17 Elevation, vertical section and plan section of typical panel on the 17-storey Camembert-like discs.

18 Example of a carved wood positive for a cornice element.



18

cladding (with insulation sandwich) and fixed to the panel by angle brackets, 14.

Entirely produced at Morin's Gilly-sur-Loire factory, the 5000 components for Les Arènes de Picasso were cast in a concrete composed of local stone aggregate and sand with white cement, and given a sanded finish. The quality and precision (within a 5 mm tolerance) achieved in these castings confirms the success of a lengthy and painstaking collaboration between architect and manufacturer. The similar care and attention paid to site organisation has kept double handling to a minimum and resulted in a remarkably well finished building by French standards. How well it will weather and, in particular, how well the devices incorporated in the panel mouldings to carry off rainwater perform, remain to be seen (see comment on p37).

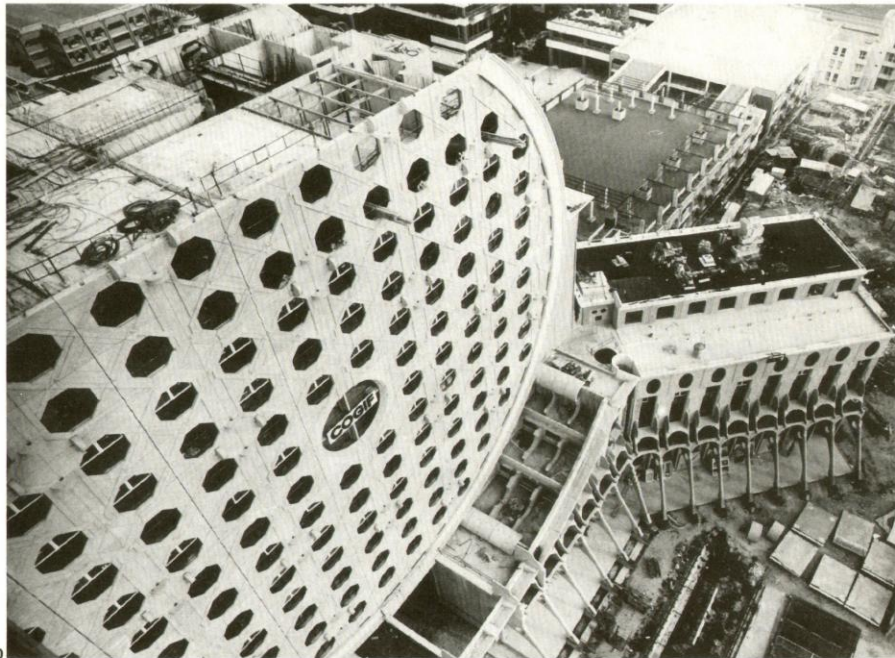
Variety restriction

Nunez frankly admits that it was only when designing his Gaudi/Gothic-inspired raked buttresses (or crutches) and splayed arches for the arcades encircling the arena to increase the light penetration, that he belatedly realised the structural potential of the reinforced precast components, rather than thinking of them primarily as cladding. He blames the arcade concept imposed by the brief for having pushed the costs of Les Arènes de Picasso 4.7 per cent over budget (an 'acceptable' margin in French public housing terms for this scale of development), but maintains that the economies he has achieved by his use of precast cladding and latterly its structural application 'have paid for more architecture'.

Nunez sees Les Arènes de Picasso as a prototype for the development of a prefabricated building system of multiple components 'allowing even greater freedom of expression' and draws a comparison with Renzo Piano's small craft-industrial production experiments. However, he suspects power politics at play in the building industry's preference for the present predominant methods—a combination of in-situ poured concrete techniques with a limited range of prefabrication—and so resisting the widespread introduction of a variety of purpose-made components.

'More architecture'

In the meantime, nothing daunted, Nunez and his team are redeploying the precast range developed for Les Arènes de Picasso for their two most recent public housing schemes at Clamart and Alfortville, using in part an in-situ structure but now with the loadbearing as well as the cladding function of the panels fully integrated in the design. The expected savings on budget will not only allow 'more architecture' but will now (one might think with an odd sense of priorities) be used to enhance the quality of the interiors as well.



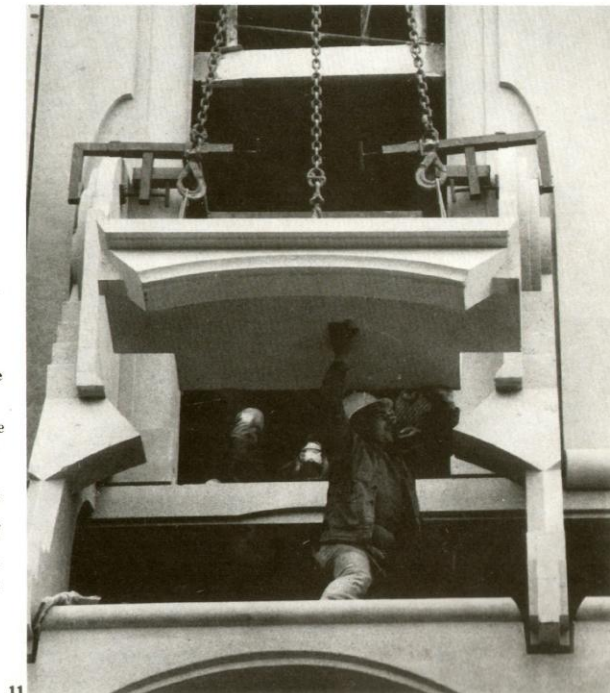
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of this theatrical design makes it initially even more difficult than at Bofill's Palacio to appreciate the quality of the concrete finish and the accomplishment of the precast components. Yet it is Nunez's use of precast panels for the facades of the Arènes de Picasso that renders such a flamboyant architectural display economically feasible for a public housing scheme.

Paris revelation

Manolo Nunez-Yanowsky's personality and antecedents are quite a match for his architecture. Born in Samarkand of a Russian mother and a Spanish father, he spent his early youth in Odessa. In 1958 the family left the USSR for Barcelona and a hard life in a working class suburb. Disenchanted and acutely aware of the disparities of wealth in Catalonia, Nunez tried to return to Russia in 1961. Crossing the Pyrenees on foot he made his way to Paris only to have his application for a visa at the Russian embassy refused. Despite his penurious circumstances, he describes this first contact with Paris and its architecture as a revelation. This brief Parisian interlude also stimulated his interest in painting and theatre. After his return to Barcelona it was through his involvement with the theatre that he came into contact with Bofill the following year, becoming a founder member of the Taller.

Nunez, like Bofill, has no formal architectural training and is the first



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to claim that he is self-taught. He played a leading role in the Taller and was head of the Paris office responsible for the abortive Les Halles scheme before leaving in 1978 to set up his own group practice, Les Ateliers du Grand Hornu, at Hornu in Belgium. An amphitheatre-like housing development there, appropriately named Theatre de Hades, a startlingly theatrical psychopedagogic institute at Wasmes (AJ 30.1.85) and Les Arènes de Picasso are his major built schemes of the past seven years. The practice, with offices in Paris and Barcelona as well as Hornu, is now engaged on the town centre complex of St Quentin-en-Yvelines and housing schemes at Clamart and Alfortville in the Paris suburbs.

It was, Nunez says, the experience of heading the Taller's French practice during the '70s, that convinced him of the potential for developing the use of French precast concrete techniques within the constraints of the system. Despite their elaboration of a classical concrete vocabulary, he feels that the Taller's housing schemes have neglected the sculptural qualities of deep modelling, texture and variety of form obtainable from French firms.

'The French building industry and contractors are,' Nunez maintains, 'the best in Europe; as soon as one asks for something rather more sophisticated and out of the ordinary they apply all their energy and know-



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how.' But then, of course, Nunez and Bofill's work in France on large and prestigious public housing contracts has also coincided with a difficult economic situation creating a far more competitive, demanding market in the building industry.

Prescribing the form

For Les Arènes de Picasso, the Marne-la-Vallée corporation planners and the public housing development company FFF Residences Urbaines already had drawn up a detailed, constraining brief, imposing the arena layout (with name to match), the 3.5 m high encircling arcades, 12, and the access alignment between the blocks—the whole to comprise 540 flats of which

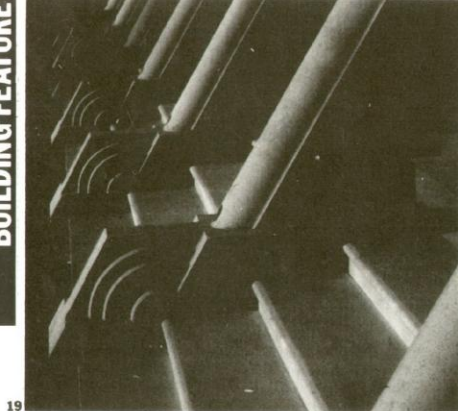
10 The idea behind the front elevation panel design was to build up a sufficiently bold overall facade pattern to override and obscure the basic panel grid. 11 The weight of the elements varies between 300 kg and the seven-tonne limit of the crane. Each element was cradled in a specially designed protected frame bolted into precast threaded sockets. 12 (below) The standard French in-situ concrete crosswall structure is shown clearly. The precast panels only carry their weight and brace the cross walls. 13 (left) The curved cornice element was pre-assembled at the works with resin glue and bolted fixings to the panel.

the first phase of 422 flats is now complete. Furthermore, the planners had envisaged a stepped treatment for the prescribed 17-storey high principal blocks on the east-west main axis.

Naturally Nunez wanted to do more than simply dress up this detailed package. Taking his cue from the preordained title, Arènes de Picasso, he set out to convey what he saw as the essence of Picasso's painting—namely gaiety—in a 'festival of forms'. For the key axial features of his design, Nunez insisted that his giant disc-on-edge blocks were both viable and compatible with the planners' stepped solution. Their signal silhouette and the reticulation of their facades are intended by Nunez to be an 'evocative



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JOHN RICHARDSON, C & CA

I. B. Morin, the manufacturer of the Les Arènes de Picasso elements, is known for the quality of its product, gained through 50 years experience of production. The elements in the scheme demonstrate a high degree of confidence in the manufacturer on the part of the designer.

With skilled mould making techniques, variety can be achieved economically, families of moulds being bred from sculptured masters in wood or plaster. While the surface finishes and certain details on this project are comparable, most British precast concrete panel contracts do not exhibit such a variety of geometric form. Complex form increases the cost of mould production, whereas changes in concrete finish and texture can be achieved within a basic economic framework.

Where the production process simplifies construction and eases the creation of exotic finishes, precasting ensures that accuracy and the quality of finish can be maintained, while making the best use of existing plant, equipment and skills. Repetition, though not essential, helps achieve this. Provided the complexity of each panel design is matched to the right number of casts determined by the selected mould material, the designer has freedom to develop his theme.

The quality of the concrete surfaces on the French scheme is good, but no better than those produced by a number of British precasters. They would be best achieved in this country using a light abrasive blasting technique or by using one of the now proven lacquer-type retarders applied to the mould face. A semi-matt rather than a smooth finish will give greater uniformity and better long-term weathering characteristics. (The desirability of avoiding the use of smooth concrete has been apparent for many years, yet architects have been slow to act on the feedback from

industry, and on the guidelines provided by the Cement and Concrete Association).

Fixing and connection design is critical to the success of any precast operation. Cladding fixings, while producing support and restraint, must permit movement from a variety of causes. Durability must be considered when selecting suitable materials, and the rate of movement due mainly to thermal differences, will determine the configuration of the channels or slotted angles used for cladding fixing.

The fixings in Les Arènes de Picasso are typical of those used in this country in the '50s and '60s for large panel construction, many of which have proved suspect in terms of corrosion resistance. Designers must be aware that non-structural cladding elements demand equal attention to fixing detail, as do the structural elements in large panel construction.

Skills of the mason

The Arènes de Picasso scheme is no doubt an interesting example of the applied technology of precasting but such expertise is not confined to France and Belgium. Precast works for current city developments in this country exhibit some of the choices available: for example, the elements produced for reconstruction of part of Montpellier Terrace, Cheltenham and Sir John Burnet Tait & Partners' use of red brick facings on precast panels and reconstructed stone for the Kensington Town Hall redevelopment in London.

Other recent projects in the UK involve what might be termed more orthodox precast elements, tending towards traditional form and detail, such as in the recent Ealing Broadway, west London development by Building Design Partnership's Preston office (AJ 10.4.85 p35), which features bays and mullions in reconstructed Portland stone.

Designers are choosing individual concrete ashlar cladding elements and large precast claddings containing

brick or natural stone facings or imprinted with classical stone detail. All these techniques reflect the practices of natural stone construction and the skills of the mason yet can be economically produced in the precast works using less skilled people.

Although in Les Arènes de Picasso large precast concrete elements have been selected, it is likely that in the UK the designer would also have considered reconstructed stone and glass reinforced cement as an alternative. The same detail could have been achieved in the precast works, but with a wider range of available finishes and textures.

Reconstructed stone is being used both as a structural and a visual material. It is worth noting that reconstructed stone panels have been employed as cladding elements up to 3.5 x 2.0 m, and weighing up to 11 tonnes, such as at Sheffield City Hall.

Glass reinforced cement (GRC) techniques have progressed to a second generation stud frame system. GRC in stud frame applications is used in single skin form, providing a face incorporating features, textures or special aggregates, the stud frame forming the fixing to the structure. In the new Hayes Galleria architects Michael Twigg, Brown & Partners are using GRC panels prefixed to steel frames at the precast works for subsequent installation on to the building frame.

In considering the French scheme, one cannot but reach the conclusion that, given close co-operation between the designer and producer, developments as interesting as the one at Marne-la-Vallée can and are being produced in this country.

There can only be such wholehearted co-operation by the precaster if he is confident that he will be getting the contract. It is sadly not unknown for the expertise of one firm to be incorporated by the architect into working drawings which are then offered to others for competitive tenders.

FRANK HAWES, C & CA

The British precast concrete industry, which has had to exist on a restricted diet of mainly commercial work for more than a decade, has developed technically even while it has shrunk. It now operates quality assurance procedures for materials and products and seems, from the evidence of this French scheme (see pp28-35), to have a better understanding of fixings and movement than the French.

The French have continued to produce large developments but have evolved methods either of disguising their repetitiveness or of superimposing a strong architectural image on to the structural system. Les Arènes de Picasso clearly comes into this latter category.

The lively inventiveness is impressive but there seems to be a

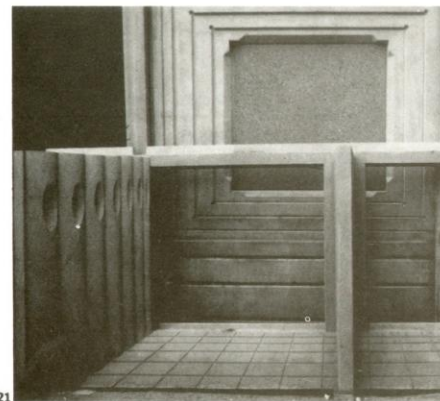
confusion of scale between furniture and building—but then that is true of Vanburgh and much of the Jacobean architecture that we enjoy. On a sunny morning I found les Arènes greatly enjoyable to visit but, in retrospect, I wonder how much its attraction relies on simply being different. Will it survive imitation or even familiarity?

My doubts as to the relevance of Les Arènes de Picasso to this country are confined to its acceptability to those who would live in it and to its longterm appearance.

There seems little difference to me between living behind an anonymous row of windows high up on the face of a large drum and a similar position on a rectangular slab. Architects need to provide places that feel good to live in. While Marne-la-Vallée may be kinder to concrete than London or Birmingham, the laws of nature do apply there. The building surfaces will

get dirty and the rain will redistribute that dirt into patterns which may well be stronger than those devised by Nunez. The process is already beginning to be visible at Les Arènes. This is not a problem of concrete but of architectural design and detailing. Perhaps it is intended that this building, like those (brick, stone or concrete) in the centre of Paris, will be cleaned every 10 years but enough is now known of the control of weathering that this should not be necessary.

I am confident that we can build housing in concrete, by industrialized methods, which will weather better and have less an appearance of being an industrial product than either the housing of the '60s or Les Arènes de Picasso. The industry would be ready if a future government were again to call for large numbers of dwellings a year to be built.



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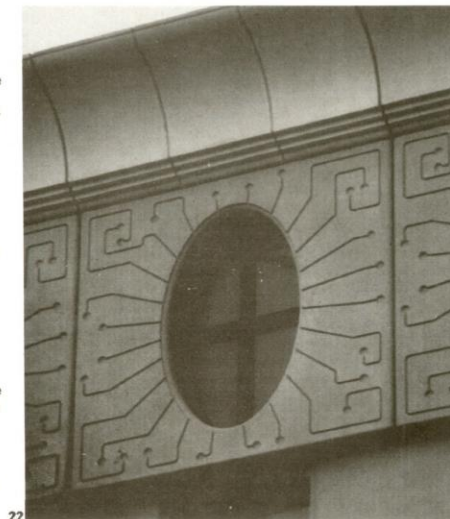
19 Detail of springing point for the played arched colonnade. The colonnade was demanded in the planners' brief. Nunez blames this element for pushing the cost 4.7 per cent over budget.

20 Detail of balcony elements above the arcade.

21 Forced perspective panel design to create greater illusion of depth, but will the rain redistribute the inevitable dirt that will collect into patterns that may well be stronger than those devised by Nunez?

22 Panel detail. Nunez has certainly raised expectations of what is possible within the strictures of public budgets and the precast concrete industry.

23 Another panel elevational treatment. John Richardson of the Cement and Concrete Association comments: 'The fixings in Les Arènes de Picasso are typical of those used in this country in the '50s and '60s for loose panel construction, many of which have proved suspect in terms of corrosion resistance.'



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architects Manolo Nunez-Yanowsky with J. M. Gomez, R. Guardia, F. Guardia, H. Chanson, G. Pizson bureau d'études (drawing office) OTH contractors Cogif-Guerra-Tarey technical director M. Bernadinis prefabrication I. B. Morin technical director M. Lutrin bureau de controle Socotec bureau de coordination GTC location Marne-la-Vallée, quartier du Pavé-Neuf, Noisy-le-Grand public housing client FFF et Residences urbaines brief 140 dwellings PAP (subsidised/aided mortgages) and 282 dwellings PLA (subsidised rent with purchase option) for the first phase total habitable area 43 056 m² construction costs 3500 FF/habitable m² (inclusive of taxes) 1980 preparatory designs March 1982 on site summer 1984 first phase completed