was bewildered, insecure. He had to listen to advice. He was still master, but he did not master the technique of building any more. And a general who doesn't know his army, an artist who doesn't know his medium, and a designer who has to choose among unfamiliar materials and processes, is in an insecure position. He cannot design with confidence, and he is in danger of losing the respect of those he commands.

"But the architect wanted to remain master at all costs. For he had a sacred duty to perform. He represented the client, the user, the public. It was his responsibility to see that the building served its purpose, fitted into the neighbourhood, was a joy to behold and live or work in, and did not cost more than his client could afford. All this, and more, as expectations of comfort rose, all the multiplying claims of the perfect architectural solution, including his own dreams of artistic wholeness and integrity—all this had to be achieved with the ever-increasing technical aids at his disposal.

"But the engineer didn't see it this way. He could see where the architect blundered, his technical inadequacies, his squandering of money on architectural or aesthetic aims which the engineer did not understand. He suspected that what the architect was doing was simply pandering to his own ego at his client's expense. And he didn't see why he, the engineer, shouldn't go it alone, with of course, the aid of the contractor. He could get the foundations, the walls and the roof constructed, all sound and solid and waterproof, he could put in the required services, enclose the required number of rooms with access and exit—the lot. Why should he need a long-haired architect to tart it up and add to the expense: he knew what he liked, and if necessary he could always hire a tame architectural assistant to make a nice perspective for the client.

"The client and the quantity surveyor, being concerned with value for money, were often inclined to share this view. Artistic values change, what one generation cherishes the next despises. To decide in the surge of new isms what is *timeless* art is difficult. Although this adjective is not infrequently bestowed by critics, it is often doubtful whether it will stick. The average client cannot be expected to share contemporary artistic sensitivity: he likes what he is used to, so quite apart from the technical and economic considerations, he dislikes modern architecture. He expects the architect to provide cosy old-world cottages with all modern conveniences, access by car, etc, and available for millions of new customers. Or so one would think if one read some of his complaints.

"One could not expect the architect to accept this valuation. He still believed in his mission and struggled to keep aloft the banner of Architecture with a capital A.

"This I know is a travesty of the present complex state of the engineer-architect confrontation. Like the image of Uncle Sam and John Bull, such caricatures have, however, a long life, and I wonder whether in the depths of the engineering jungle there are not tribes who still see reality in this way. And would this, I wonder again, be at the root of the idea that a successful integration of all the building services, or even a meaningful discussion of such integration, could be achieved without the participation of the architects, or the heating and ventilating and structural engineers, for that matter? Of course one must grant that there is a great deal of truth in this caricature, otherwise there would be no problem. But I believe in the architect's mission, all the same. Some, or many architects, if you like, may not be good enough, and may cling to outworn ideas. But architecture is important. It is about time engineers realised that engineering is useful, necessary indeed, but not enough. ❞

Theory for Total Design

Sir Ove Arup

I am invited to write a short piece on "The theory and effective practice of cooperation between architects and allied professions". Not just a quart, but a couple of cubic meters into a pint bottle! A tough proposition! But I'll try.

First the theory. It is a fact, that any building or construction nowadays must be preceded by a design or a number of designs, if you like—what I call a total design—which is the key to what it is intended to build and how it is going to be built.

It is also a fact that such a total design can rarely be produced by one man. It requires the collaboration of several people who have been trained to deal with particular aspects of this total design—a special arrangement, structure, services and so on. But if every specialist produced the perfect solution to his particular problem, these part designs would simply not fit together to produce a successful whole. And of course, it is the whole we want. In fact, we want more and more things, as many as we can get for our money. And we want to satisfy not only the client, but also the people using or having to live with the building or bridge, or whatever it is. We want it to harmonise with the environment and we want to ensure that there are no destructive or anti-social side effects.

That this calls for close integration of the part designs and close collaboration between all the people who should or who do influence the design is obvious, and is all the theory that is needed, as far as I can see.

This consideration of every aspect of the design and fitting the bits together to produce the best possible total solution is the real art of designing. And as in all art, there is more to it than meets the eye. It is not only a question of meeting all the different requirements in the fullest possible way at the least cost, it depends also on the simplicity or elegance of the solution, the felicity of design which has the power to inspire those who comprehend it, and which is the reward the designers hope for. It can rarely be produced without taking great pains and it cannot be defined or measured.

How to ensure that every design gets the care and attention needed to produce a thing of quality is, I suppose, the question covered by the second part of the title: "the effective practice of cooperation between planners, architects etc." That is a much more difficult question to deal with because there is obviously no general rule and none that by itself would guarantee the desired result. There are even no generally accepted criteria by which one can decide whether it has been achieved or approached in a particular case. But whereas abundant lip service has been paid for years and years to the need for such cooperation in all its forms, the progress in "effective practice" has been disappointing.

The reasons for this are manifold and well known. The different professional institutions have nursed their separateness for too long to be able to change their attitude in a few years. Educational establishments have concentrated on turning out specialists, thereby fostering a narrow outlook. The whole organisation of the building industry has its roots in the past and cannot adapt itself so quickly to the vastly changed social and technical climate of today. It is fragmented, full of vested interests, of rivalries between professions and trades, about status, money, responsibility and influence. It clings to outworn practices and is governed by partly irrational legal restrictions. There is also the traditional chasm between design and execution and the stranglehold of the costing system leading to the costing of non-existing designs as if quality and integration did not matter. This is not the whole picture, of course, but it is things like that which make it difficult to create the conditions where collaboration can take place between those technicians who really understand the business of building and who are eager to get on with the job of finding the right answers ie the right designs at the right price.

But what then is "the effective practice of cooperation" and how can it be brought about? My short answer is that you learn cooperation by practising it. You will then learn to understand the other fellow's point of view and the value of his contribution and you will learn to see your own work as part of a whole, which will gradually tend to make your collaboration more effective. But of course, it depends on the quality of the people in the team, and especially on the leaders inside each of the disciplines represented. If they have the necessary enthusiasm and will to produce a work of quality, half the battle is won.

Talking or writing about collaboration and integration is not nearly as effective as we have seen. But that does not mean that it is useless—on the contrary—it is a necessary preparation. But also here it depends on the quality of the talk. The tendency is for talking to be done by those who are good at talking. But it is much more important that it is done by those that know how to build well, and who understand the need for integration. Each job is in many ways unique, but designers can help each other by explaining how they have surmounted certain difficulties on their job, especially in the domain of integrating the various disciplines, including the method of construction or manufacture which has or

should have a major influence on all designs where economy is of importance—which in varying degrees applies to all of them. And, even after 40 years of talking about collaboration and integration, it is still necessary to convince authorities, private clients and their legal and financial advisers that it will repay them handsomely to ensure that they have got the right design before they start to build and that this means that the advice of all those who have a significant contribution to make to the total design should be sought before the basic design decisions are taken. This means, at the very least, that they must have the opportunity to meet and harmonise their requirements on the basis of priorities established by the leaders to the team and the clients. This can be a long process but out of this melting pot a purified design should emerge which will more than repay the effort expended.

It is a sad fact that most of the people who are not designers but have the power to get things built, do not understand this. They think that designing is a routine matter. It can be reduced to that and that is the trouble with our environment.

Design for energy conservation

Alex Gordon

There is little I can contribute to the general subject of multi-disciplinary working on building design that has not been better said by Sir Ove Arup. What may be worth a few words is the developing importance of team working for good environmental design — not just building design — in the context of two situations that have become clearer — or more critical — since Sir Ove wrote in 1970 or even in 1972. I have in mind the developed public concern over what is happening to our towns and cities, and our increasing awareness of the finite nature of many of the resources on which we have previously relied — particularly energy.

Considering the latter first, it is clear that building design for energy conservation, in construction and use, is going to call for much better collaborative team working than before. To get the best results, no individual team member can work in isolation. In, for example, the establishment of the optimum duct velocities in an air-conditioning system, with their bearing upon the duct sizes and the spaces necessary to accommodate them, the best solution can only be achieved when contributions are made by virtually every member of the design team.

Success in design for energy conservation calls for sophisticated collaborative working between specialists of adequate calibre and breadth of outlook, and the present crisis may prove a blessing in disguise if, as a result of it, the necessary design techniques are properly developed and team members, with new skills, appear. Although such changes may stem from the primary objective of saving energy, they may well make for better results in other areas. This will, of

Alex Gordon

course, be all to the good—provided we maintain a sensible balance and do not allow the tail to wag the dog. This will not happen if Bill Hillier's four-function model is fully understood and respected by all concerned, ie, an awareness that we build *(a)* to add richness to the cultural and visual landscape, *(b)* to contain sets of activities, *(c)* to modify climate and *(d)* to add value to resources. If any of these is subordinated, for energy or for any other reason, there are considerable dangers of ill-balanced design.

It seems to me that whether or not this will happen will not only depend upon the willingness and ability of people to work in a multi-disciplinary way, but upon the composition of the design team itself and of the motivation and control exercised by the people who initiate the need for the building. A government department and an entrepreneur will approach the design-and-build operation differently, and how they do this will have an increasingly important bearing on the character, quality and long-term effectiveness of the result.

But even if the buildings themselves are better, this deals with only part of the problem and harnesses only a proportion of the opportunities. Resource conservation can provide a good discipline at other levels also; not least in the government's own strategic planning, which also involves multi-disciplinary working. Here, however, the teams are different and the building design team—as a unit—is not even involved.

Only central government strategic planning can settle policies on centralisation or decentralisation, high or low density development, new towns or expansion of existing ones, electricity generation patterns and opportunity for waste heat use, and so on, but such matters are of increasing importance now that resource conservation has to be taken more seriously. Although I am not so satisfied, the Matthew/Skillington Report seems to accept that the government's strategic planning is working satisfactorily, while the real deficiency lies in the gap between strategic and regulatory planning. I do not disagree that below the level of strategic planning the situation is complex and unsatisfactory and needs to be improved, but the energy crisis suggests that tidying up is necessary at the upper level also. And this means identification and coordination of a variety of multi-disciplinary skills in a more critical, difficult but important operation than that encountered in the design of single buildings. On its effectiveness depends not only conservation of resources, but ultimately the general quality of the built environment.

The calibre of the individuals involved in any operation—and particularly a team one—is all important, but it is not sufficient to rely upon personal skills only and to pretend that "organisation" is secondary. For an individual to fulfil himself (or herself) and produce the best results, the framework within which he works is vitally important. It is, of course, only a means to an end, but, where proper consideration is given to it, the individual will have a better opportunity of achieving good results. This is particularly important in the context of work in the public sector, for it is only where there is opportunity to give of one's best that individuals of the right calibre will be prepared to participate. And we need the best people in strategic and physical planning, which is essentially a responsibility of government service.

No neat professional boundaries

Brian Goodey

The state of relations between the environmental design professions depends very much on the position of the commentator. From the academic teaching and research platform—a noisy minority position—the past few years have seen a coming together of architecture, planning

Brian Goodey

and the social sciences. At least, this seems to be the case if the right journals and books are read, and the right conferences and courses attended. There is, however, the disturbing feeling that elsewhere there is little convergence. Just occasionally teaching staff may have sublimated professional and career interests sufficiently to really focus on courses—usually of short duration—which attempt the integration of small-scale and large-scale design concerns but, in spite of much discussion, the reality of urban design courses is yet to have much impact.

It is easier to point to the superficial and self-important professional gestures—such as the joint RIBA/RTPI Newcastle conference on the "Future of the British townscape"—than it is to institutional support for academics or those in practice who

> "In truth, the environmental professions are a fairly insignificant element in society"
>
> *Brian Goodey*

are putting their careers on the line in order to achieve some integration of approach in the various levels of education. Quite probably the desire for closer integration of effort will always be a very personal matter, building on shared interests rather than on some imposed coming together. But this personal process is only likely to occur as a tolerated addition to professional development and, as such, is unlikely to meet what might be determined as societal needs.

In truth, the environmental professions are a fairly insignificant element in society, of interest only to those who are included or who aspire to being included. The ubiquitous man in the street may allocate responsibility for certain actions to the planners or the architect but his vision of environmental quality—expressed in his own non-technical terms—will be much clearer than any image of the professions whose duty it is to alter or maintain that quality.

Professional education and practise may be seen as both necessary and self-explanatory by those within, but they are also a process by which the mind and actions of the designer are removed from the street in which ubiquitous man stands.

Participation, however construed, should be a learning process for both the professional and the public. In planning, participation is now a legislated encounter, in architecture the game of "hunt the client" has hardly given way to any concept of design participation, and in engineering and surveying we may ask if any interpretation of participation is seen as important.

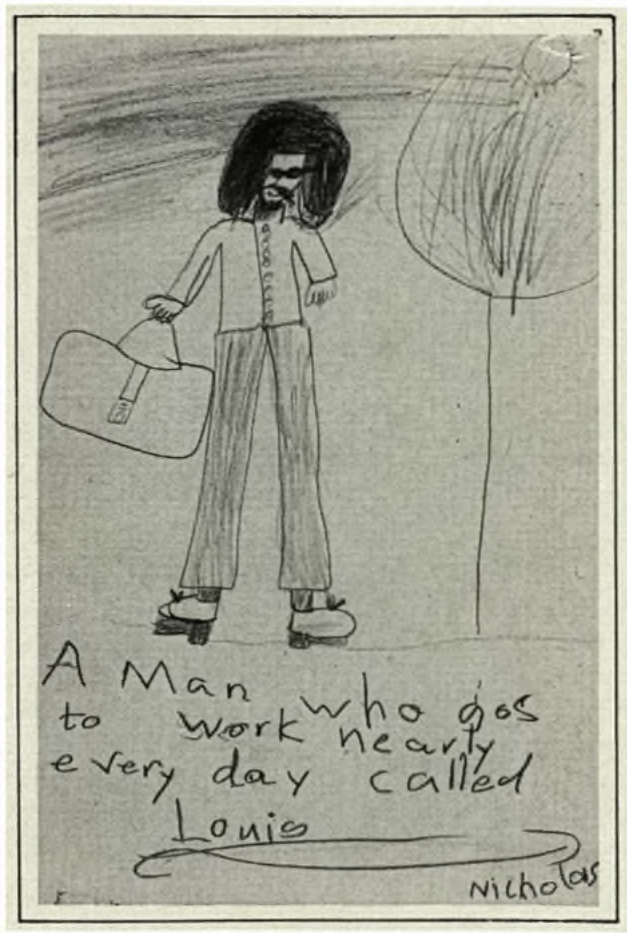
The failure of the environmental design professions to provide society with an integrated view of present conditions and future options is probably most evident when the professional is faced with a class of secondary school students who, while encouraged to explore environmental issues, have no neat gridiron of professional boundaries to erect over the task. The disturbing thing is that their clarity of vision usually puts the professional to shame.

Concentrate on simple human-scaled buildings

Louis Hellman

The notion of multidisciplinary teamwork has been one of the constantly recurring myths of the modern movement since the dawn of the machine age in building and the German Werkbund's promotion of the marriage of art and technology — the designer, engineer and industrialist working in harmony towards a common goal. The Bauhaus later amended this to include architects, artists and craftsmen uniting in accordance with a new medievalist ideal.

Lately we have experienced the extension of this idea with the attempted integration of architecture and the human sciences — psychology, sociology, anthropometrics etc, and also with the concept of the integration into one team of the various disciplines concerned with planning buildings—planners, architects, quantity surveyors, engineers etc. The argument for this was that the increased specialisation of each member of the "team"



'Built Environment'—advanced as ever—is the first publisher of Hellman junior's work.

coupled with their alienation from each other was responsible for poor building and if only each could be closeted cheek by jowl with the other from the inception of the project each part of the resultant building or complex would synthesise with the other in perfect harmony.

However, the fallacy behind this admirable if rather woolly ideal is one underlying the whole modernist concept of team design—the group of specialist boffins subjugating their individuality in the cause of rational objectivity or the scientific approach to design problems. Successful teamwork depends heavily on rules and does not occur too often in creative fields. For example, the best way to get the football into the goal might be to pick it up and carry it, but of course the rules do not allow that. In design terms we need, as never before, lateral thinkers grappling directly with human problems—rule breakers if you like—and this is best achieved by one or two people at most. Too often in the multi-disciplinary team approach the rules take over and we get hospitals or system built schools (MACE is a "good" example) which are as bland, featureless and dehumanised as any mindless package deal.

Alternatively, one of the stronger disciplines may be given greater emphasis than the others, structure for instance or the Nervi syndrome. Also if certain members of the environmental design team have been too narrow in their approach, architects and planners have often had pretensions of being over broad in their view—indulging in pseudo-philosophical conceptualising instead of concentrating on simple sensitive human scaled buildings. At the same time it is not because the architect has been too dominant over the rest of the team that mediocrity or worse has resulted but because he has given them too much latitude, assuming that the technical boys would at least get the mechanics right if left to their own devices. Hence the plethora of building failures, the extremes of which are seen in the Ronan Point, Summerland and High Alumina Cement disasters.

For the related disciplines scientific content is very small—the activities of quantity surveyors, structural engineers and services designers are often as rule of thumb and speculative as the architects, and can all be made subservient to human requirements which is the architect's job. The fact that he hasn't been fulfilling it is another matter.

The answer to increased specialisation is not to get all the specialists together and hope they interact but rather to avoid specialisation itself. If the professions are alienated from the industry and from the people they serve (the users), the answer surely is to prevent that alienation from occuring early on. If the constituent professions involved with environmental design related individually to political and social realities, and the needs of the society, there would be no need for attempts at artificial horizontal integration—each would plug into the same source as it were, integrating with the community rather than one another.

To some extent, this is happening now. The idea of a multi-disciplinary integration of specialists is related closely to economic surplus and the proliferation of industrial products—one has to have experts to choose from the plethora of alternatives and integrate their choices. In the present state of economic recession and energy waste hysteria, the various institutes concerned with the environment—planning, structural, services—are undergoing a long overdue reappraisal of their roles, a result of pressure from society.

For the same reason the RIBA is in disarray—its leadership having ridden to the top on the back of economic growth rather than quality of service—it cannot radically alter its thinking, it has no thinking.

If the need for multi-disciplinary teamwork is disappearing, then the need for multi-disciplinary people is dire . . . in other words, more Walter Segals (whether they be quantity surveyor or bricklayer) and less . . . you know who. One field in which the RIBA could implement radical changes (in association with other institutes) is education, substituting a comprehensive system for the present divisive and elitist set up. Courses could be pruned of their irrelevant academic bias—dispensing with much sociology, psychology, management theory and pseudoscience—and run on an atelier or workshop basis.

Apprentice architects, builders, quantity surveyors, engineers, craftsmen would be engaged, not on paper exercises, but most importantly on actual building projects for the community—blurring the professional distinctions at this stage could cope with any future deficiencies in "integration".

Radical changes like this will never take place however, while the RIBA leadership maintains its vested interest in training qualified drawing board fodder.

Professional rivalry or common purpose

Team or tussle

Michael Thorncroft

Michael Thorncroft

It is surely amazing that the professions that we see so vividly in the Forsythe Saga—solicitors, architects, surveyors, estate agents and others, seem hardly to have changed in over a century. Newer professions, concerned with the environment, are just as institutionalised and traditional as the older professions of the church, law and medicine. We inherit from the medieval guilds the determination to preserve professional identity long after functional necessity has ceased.

Yet historically the dividing lines between professions are largely accidental. Personal antipathies in the mid 19th century prevented quantity surveyors being incorporated as architects. A few powerful personalities toward the end of that century ensured that a wide group of loosely related professionals later became chartered surveyors. One only fully appreciates our arrangement of environmental professionals when we see the very different description, function and status of professionals in Europe.

The British evolution of these professions began with the requirements of 19th century expansion of town and country. Most of Europe started industrialisation and urbanisation later, but thus was able to rely far more on university training. So today, the British professional's horizons tend to be limited by patterns of operation established over 100 years ago; his European counterpart is often restricted by an educational background too closely linked to a theoretical discipline.

Very few of us are conscious of these professional chains. Yet in practice, they not only determine the way we regard our own roles but also how we see other skills. By and large, professional territories are defined and respected but they may have only slight relevance to the problem in hand. Etiquette demands that each professional is left alone to carry out his own job so that bridging between say, the architect and valuer, is discouraged. But it is in a frontier zone such as this, concerning the value of design decisions, that the success margin lies.

Some years ago, the chartered surveyors held a number of meetings on the "development team" — its composition, functions, and quite frankly, its pecking order. Not surprisingly, the chartered surveyor, as economic adviser on cost (capital and maintenance) and value, was found to be the natural leader of the team. The worst fate that could befall any project was for the architect to go too far down the road before a surveyor was called in with his bit and bridle.

Naturally, personal relationships soften (but occasionally harden) the sharp edge of professional division, though amity is not a sure remedy for success. Frequently tension between the different experts brings out the best, but however important the emotional bond in the development team, it is not a substitute for understanding. The real need is for a professional bridger; the expert in one field who can forge links with another. Such polymaths are rare and becoming rarer as the advantages of specialisation are so obvious. I should say they are a dying race, for the majority of these distinguished individuals are coming to the end of their professional careers.

To suggest a new profession—the project manager, whose function is to coordinate and control the development team—is not a solution. It becomes too easy then to paper over the professional cracks with compromise solutions, instead of fighting them through. There is no other way than to think, study and debate in spheres that are unfamiliar to us. Out of struggle is the effective development team welded.

A single employer of interprofessional groups

Joe Hirsh

The relationship between professional people working on different aspects of a project can only be complementary and harmonious if they have a common aim. It is too often supposed that when professional people, working for different clients such as landowner, builder or local council, cannot establish a good working arrangement, with all the resultant delays, misunderstandings, quarrels and abortive costs, then it must in some way be their fault. If only the architect or the planning official was more cooperative the project would make wonderful progress to the delight of all concerned: if only the building contractor would use a little common sense instead of spending all his time making out claims for extra payments, the job could be finished within the estimated cost. This is not really so: the causes of bad relationships lie more often within the divergent desires of the respective employers, and the easing of such situations can only take place if the client organisations can find a more common purpose.

This means that development companies must take a greater interest in the real social and environmental conditions they are tampering with; and this must include their bankers, accountants and lawyers too. Failure to recognise this will increasingly bring them into conflict with local planning authorities.

Teamwork between professions can only produce results of high excellence when there is a truly common purpose; they may then produce works of greater quality than a gifted individual can produce alone. It can be argued that the supreme works of human creation have always been produced by a