ONE UP, ONE DOWN:
ARCHITECTURE, PLANTS AND ANIMALS

by

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INTRODUCTION

Although the two projects discussed in this paper are called farms, they are so named only to place them in a specific context. The two were not developed to discuss agricultural issues nor were they primarily concerned with how they effect the farming process. The context of agriculture was selected because of its relatively little architectural development and it provided some constraints with which to work. These generalities occured within the context of farming and between farming and another context of similar ideas or foundations, in this case the church cloister. While the main body of this paper is a description of these generalities and their applications in agriculture, the substance of this thesis is found primarily in the appendix where it is explained visually.

To discuss one idea you need another. The farms are presented to provide that dialogue. One is the foil for the other; conceived as a

kind of joke to allow it certain liberties, (although it is sometimes hard to know which is the joke and which is not.) The high rise vegetable garden and the long, lean cow palace are ideas which are nothing more than amplifications to push their concepts and see how design can act and they respond. In addition to the two farms themselves, a tension can be also set up between the farm and the history of the farm or between farming and a similar activity, in this case the development of the church cloister.

In selecting external reference models, certain generalities for comparison need to be established. These can include structural, organizational or a form language. In no way do all of the qualities of the comparison model need to appear in the primary object. One strong similarity is all that need be used in making this reference and activating the checking or control action. For the farm the

reference model selected was the church cloister. Its development in form and definition appeared to be similar to that of the farm.

The cloister's form, spirit and role can be described historically as a series of reformulations. From its beginnings as a sacred section of ground whose only boundaries were implied or set by tradition, the cloister went through a series of role changes. In time the sacred ground was enclosed by a building and became formalized. With this formalization, its importance increased and it became the center around which people lived. As it became more enclosed, it was reformed into two areas: one area was open and semi-sacred, while the other was enclosed and was more sacred. The outside was for the masses, the inside for the few. This was the forerunner to the cloister. It was established as an external portal to a sacred area. It now had form and was an element that had a special relationship with

the church.

As the christian church became more dominant, the role of the cloister changed and all became welcome into the sanctuary. The need for a semi-sacred place had ended. The cloister was moved and redefined. From its position in front of the church it was placed in an area to the side. It went from a place of inclusion to a place of exclusion. It had become a place for certain people of the church to be separated from the masses. With its proximity changed, the cloister was in a position to be the organizer and not the organized.

As the primary object, the cloister also gained symbolic importance. It now was the historical reference to the original idea of the sacred ground.

Through all of its changes, the character of the cloister was constant

as was its basic form. It was primarily its definition and use that underwent change; a change that was initiated by the users and the context of its use.

Like the cloister, where its circumstances affected its form and placement, the vertical farm is a result of a rural activity occuring within an urban context. These circumstances coupled with the technology of soilless agriculture, hydroponics, presents a condition previously not available. It also presents an absurdity which allows a number of tolerances and liberties.

A vertical farm is a field upended. It is the manipulation of a traditionally horizontal activity reformed to operate vertically. With the verticality and the urban context the opportunity to use the ground for other uses becomes available. The other parts of the growth sequence, which includes processing and distribution, are possible at street level where the consumer can come in contact with the process.

The farm is organized by the field as it separates the public/research

area from the processing plant. The sequence of growth and harvest would be supported through mechanical means. The fields would consist of growing trays prepared with a rooting material. Within these a network of piping would transfer liquid nutriment to the roots of the plants. Harvesting would be accomplished through a mechanical picker after which it would be conveyed down to the processing plant where it could be sorted, sized, and packaged. This simplified description of an elaborate process provides the criteria for the proximity of the elements within the building. In the organization of this building a hierarchy of structure and place for primary and support operations became the issue. The building in effect is really a support operation.

While there was more of a concern with sequence in the vertical field, the barn, in addition to that, needs to concern itself with the ideas of growth. As with the vertical field there are also the issues of structure, place and the relationship between them. The initial development of the barn would need to include all of these things while operating as an animal enclosure and as basis for a livestock confinement operation.

In developing the barn the structuring device which would control the support operations had to begin as that thing which determins growth and specifies sequence. For the barn this would act as the constant. For the variable, a grouping of parts which would provide service, support and enclosure, primarily enclosure, also required development. The enclosure panels needed to fulfill a variety of conditions and so had to be explored as a range. They would be asked to relate to one another as well as to the structural frame. The form and

construction and size would be variations of some established constant. So, the structural frame as the constant and the enclosure service package as the variable provide the outline for the barn and its exploration.

The search for the frame was prompted by the desire for two qualities: one, a reference constant and two, a growth sequence. With these the support frame would act as a re-statement as well as a clarification of the attitudes mentioned earlier. As a constant, the frame structures the enclosing panels and the service lines by attachment to it or placement within it. As a sequence, the frame provides a constant method of erection and a predictable growth. Both are important to the barn as a whole so it can evolve and reform itself. With the structure established the enclosure and assembly require discussion.

As the primary component of enclosure glass reinforced plastic units

were selected. They demonstrate certain qualities that lend themselves to animal confinement and allow for mass production. Because of the different kinds of enclosure, the GRP units needed to provide a range in size and quality. To provide this range a basic panel is needed. A 4'x4' panel was the basis for the set in both form and construction allowing for size variations. Double in size the 4'x8' panel was the next increment and became the panel used in most cases. A second dimension was added to give more depth to the panel. This 4'x'8'x3' unit provided additional space as well as enclosure. The final increment increased the panel height and completed the size and form variations.

In much the same way as the panels the roofing units have a size and quality range. Beginning with the long span element, a basic form of construction was made which allowed the panel to enclose as well as span the twenty feet between the rows of frames. A smaller roofing

unit covers part of the frame and completes the enclosure of the barn. A special unit was placed on the frame as a light catch and as an area for the recycling of air through the mechanical services.

As the enclosure is completed, the frame finished and the barn formed the assemblage has not only a conceptual similarity but also a visual likeness in its construction to that of the vertical farm.

There is always present an underlying responsibility to the symbolic and practical history of the whole, the barn. The barn began as a device of the enclosed. Its form, priorities and placement were responses to that which it protected and contained. In most cases it not only held those things important to the farm and farming but also held the farmer himself for it was the first building built by him. As the activity of the farm increased not all things could take place within and the barn had the additional responsibility to make a place external to it and provide for these things. It must act as a device of implied place. It is here that the term "barn yard" is appropriate as the barn yard became a place, like the cloister, around which the activities became organized. It is here too that the barn term is used collectively as all those structures surrounding the yard. In time the farm's activity and role changes and grows. Specialization and changing needs present themselves to the barn and it must respond as a device of separation.

As such the barn begins to operate by structuring a range of products and processes which are both within and external to it. At this point too, the barn becomes redefined to include both the buildings and the areas around them. Like the cloister the farm's basic relationship to the user remains the same, but its role, function and definition have undergone multiple changes.

SUMMARY

The similarities between the two farms result then from the initial generalities. The use of sequence and growth as the basis of organization and the use of a constant and a variable defined the parts and their roles within the whole of each project. In each of the projects the prominence of a structure as a primary concern appeared and was responsible for how each was organized and constructed. The tension that was established between the two farms, the farm and its history, and the farm and the cloister provided a check for what had occured and suggested the direction for the next step.

APPENDIX

Figure 1	FIELD DIAGRAMS
Figure 2	PLAN SEARCH
Figure 3	2D CONCLUSION
Figure 4	SECTION SEARCH
Figure 5	THE TOWER
Figure 6	CLOISTER AND FARM
Figure 7	FIRST FORMULATION
Figure 8	CATALOG
Figure 9	STRUCTURE
Figure 10	ASSEMBLY
Figure 11	ALTERNATIVES
Figure 12	THE BARN

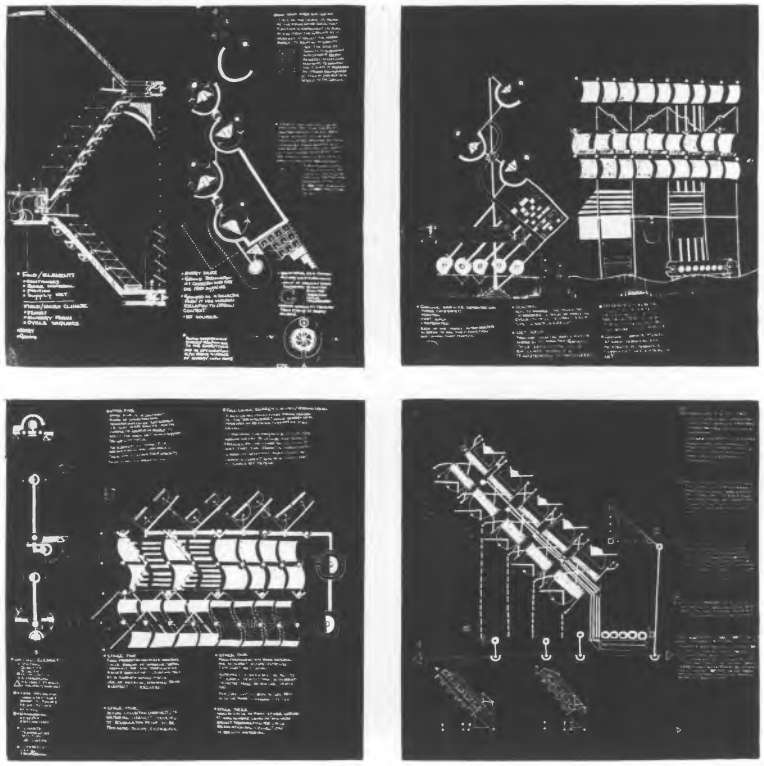


Figure 1 FIELD DIAGRAMS

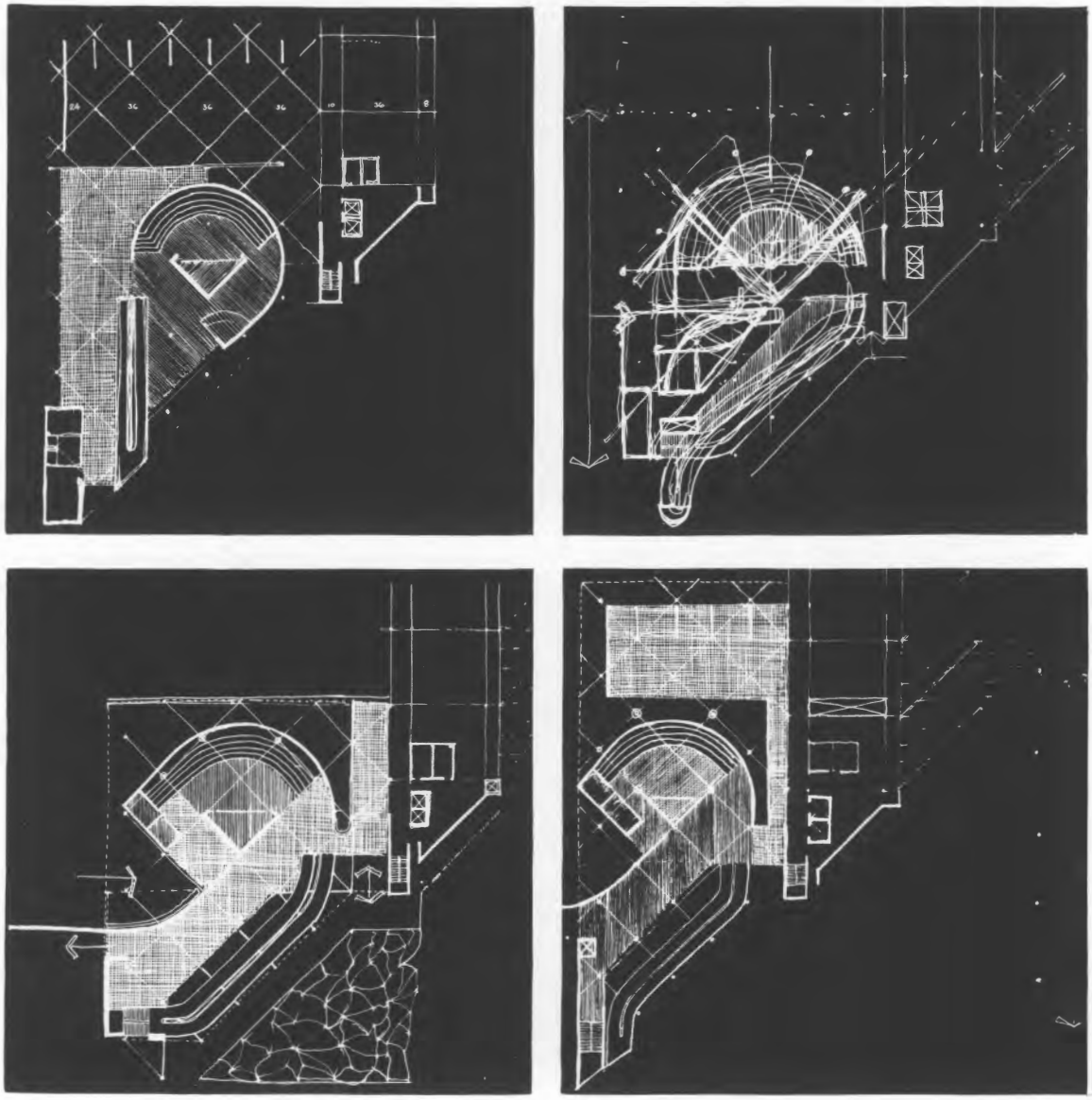


Figure 2 PLAN SEARCH

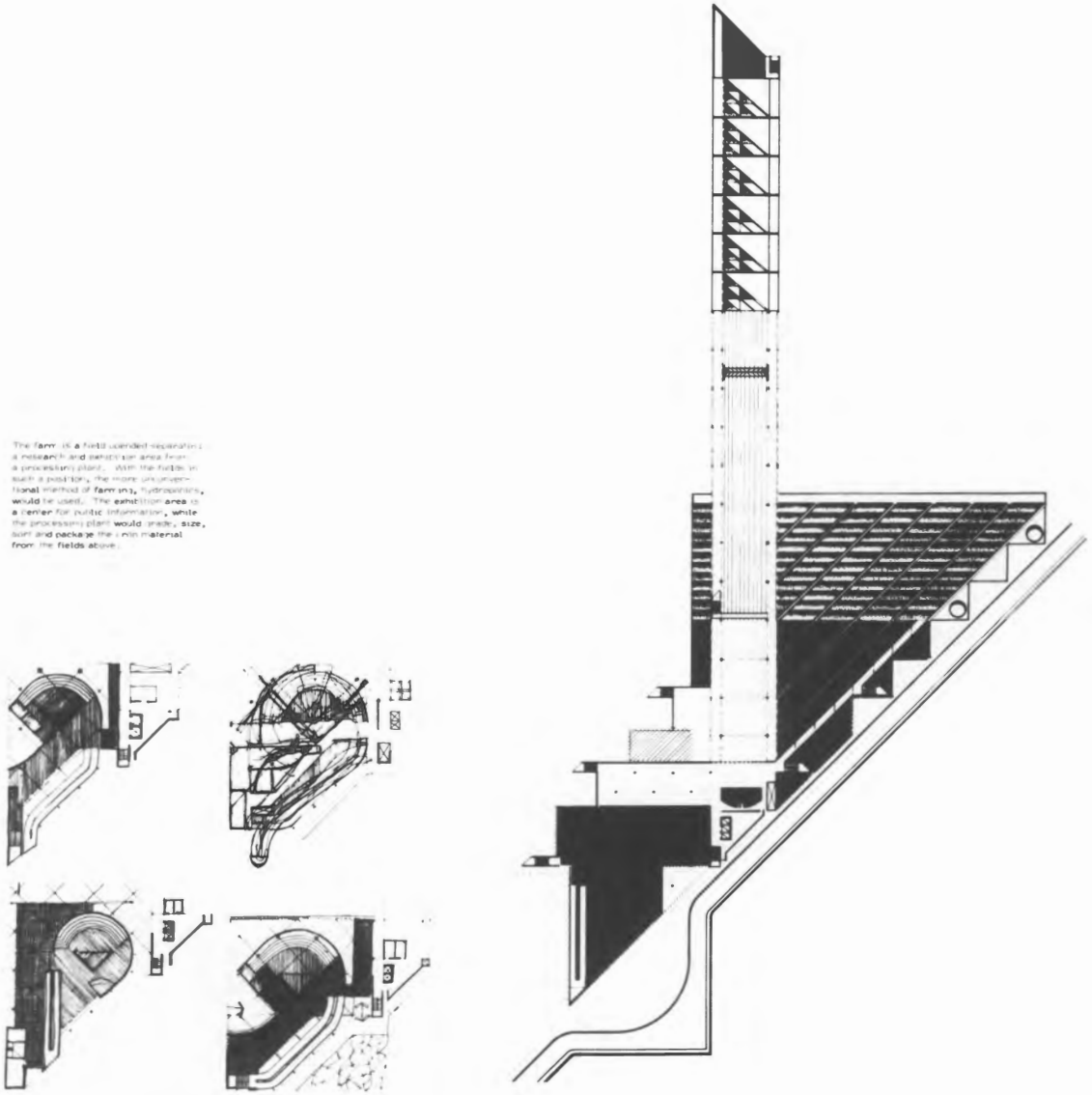


Figure 3

2D CONCLUSION

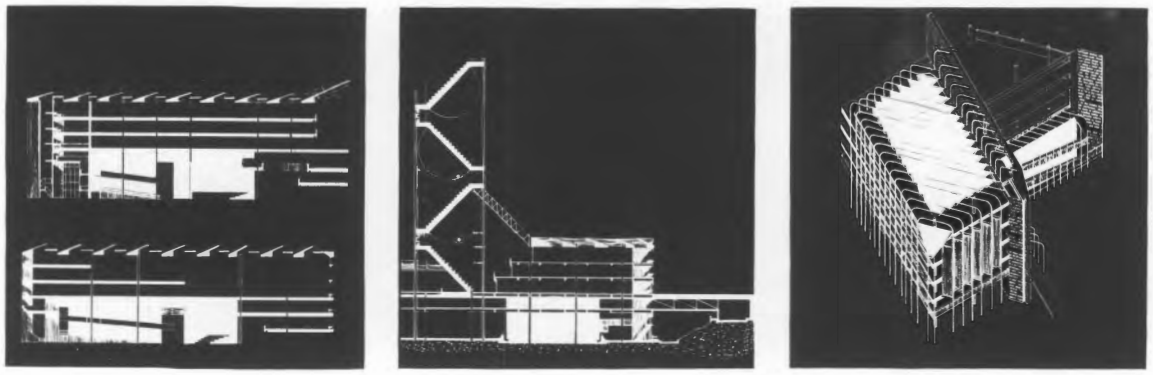
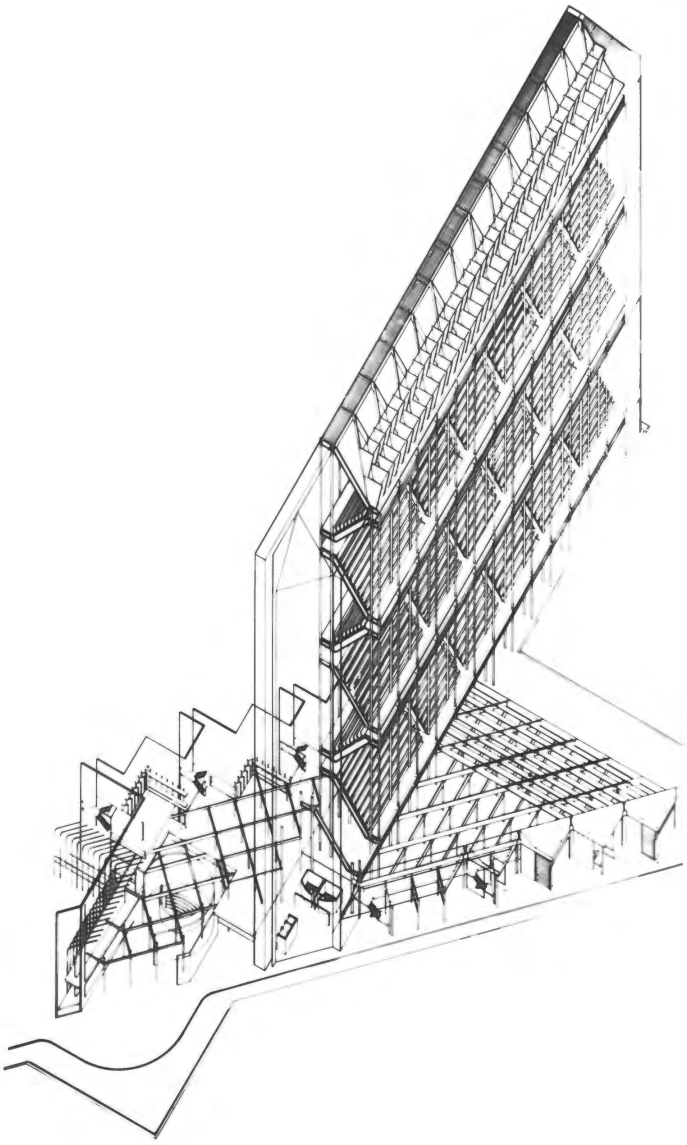


Figure 4 SECTION SEARCH



0 The sequence of growth and harvest in a vertical field would be accomplished through mechanical means. The process could happen as follows:

1 Growing trays are prepared with rooting material and liquid nutriment.

2 This complete, planting would occur and a cultivation cycle would begin.

3 As the plants reach maturation, the nutriment and climate are adjusted.

4 Harvested, the crop would be sized and packaged in the plant below.

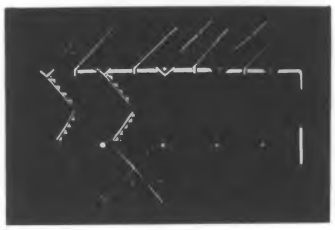


Figure 5 THE TOWER

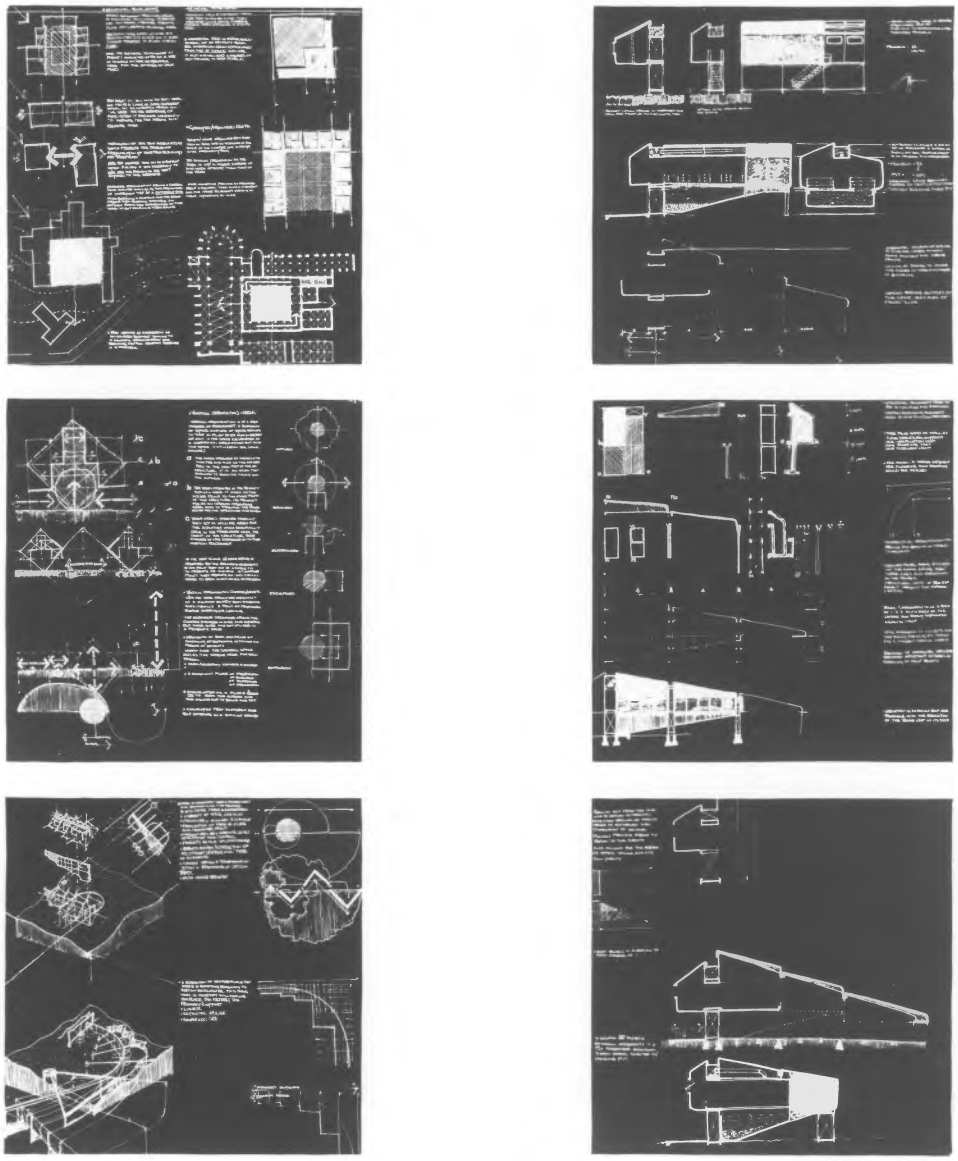


Figure 6 CLOISTER & FARM

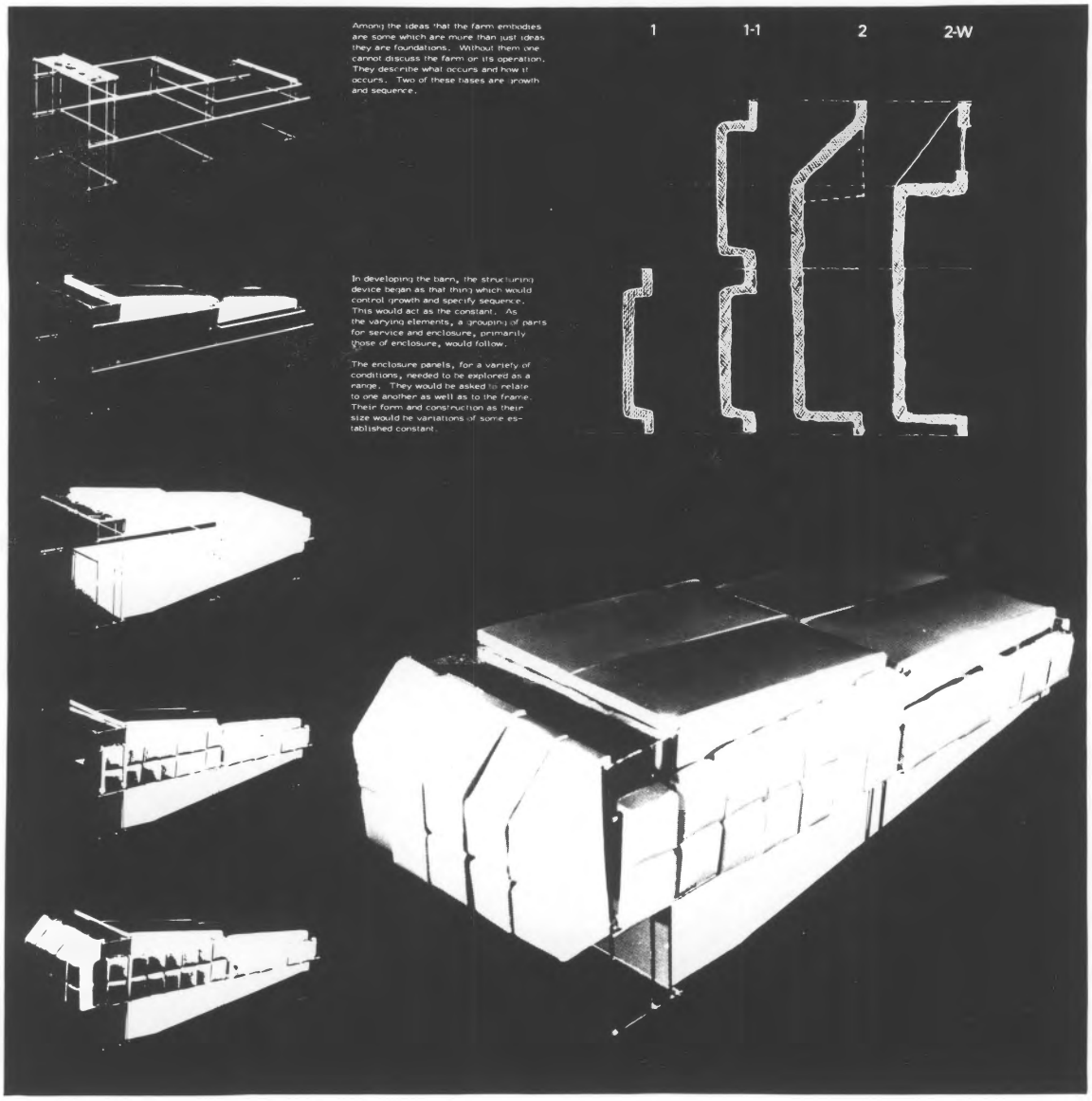


Figure 7 FIRST FORMULATION

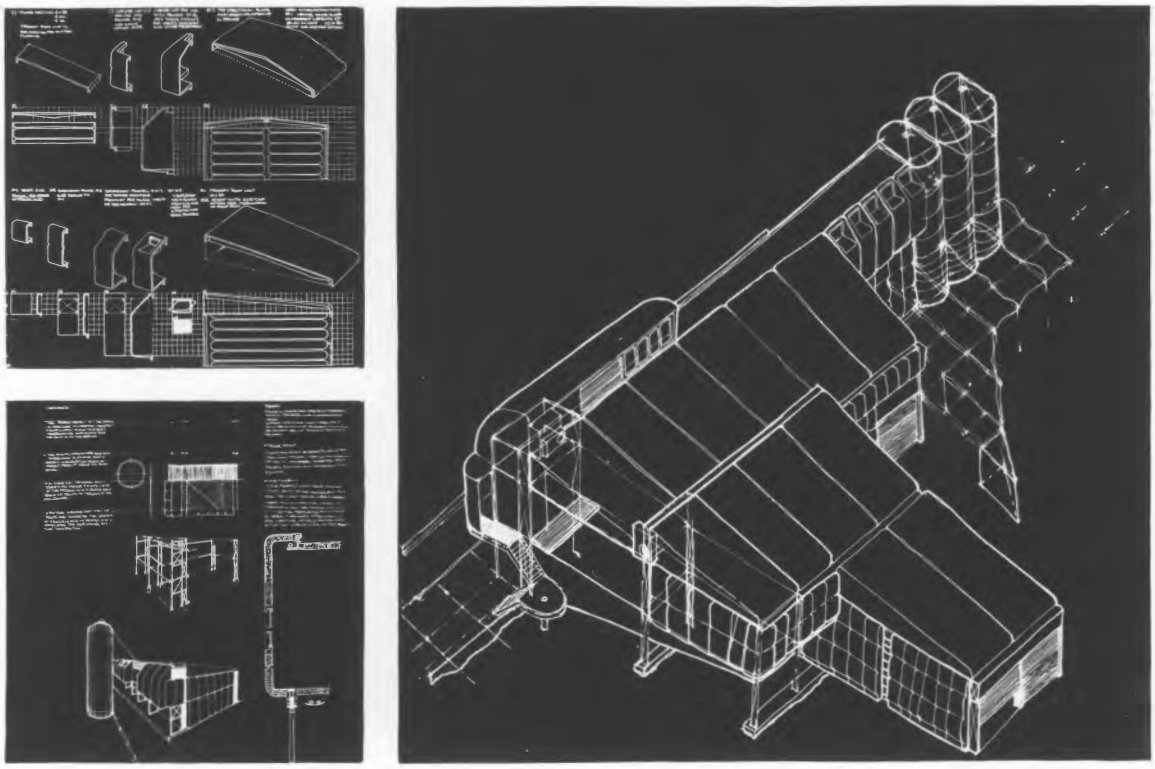


Figure 8

CATALOG

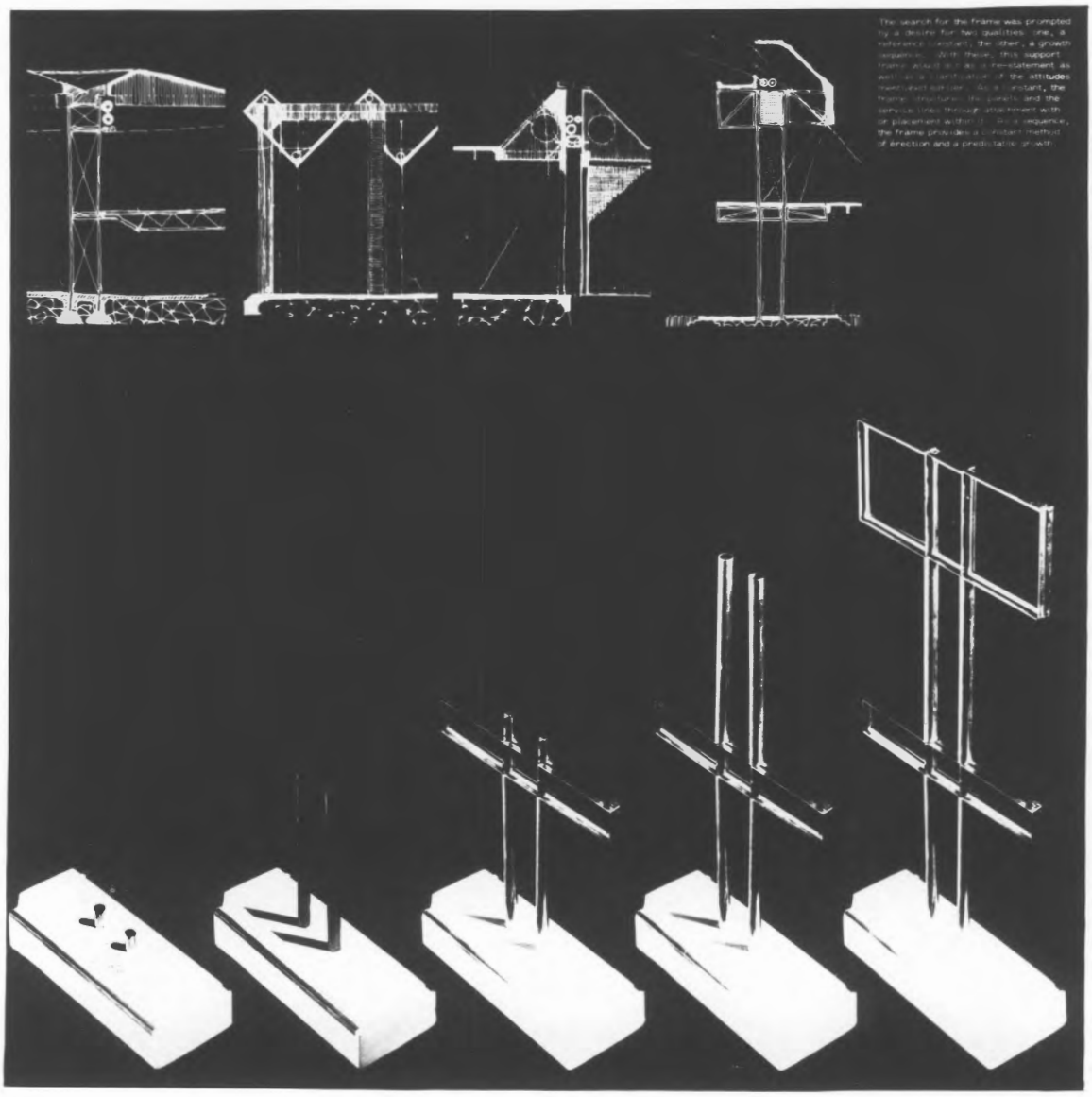
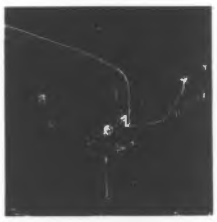


Figure 9

STRUCTURE

The assembly of the parts, begining with the panel and the frame is now extended to include the other components. These items, the foundations, flooring, service networks, etc., are brought together and begin to complete the whole which will become the barn. The method by which this assembly will occur activates more specific concerns by asking directly certain construction questions. As these begin to be explored and then clarified, the question of the next larger whole, the barn itself, begins to appear.



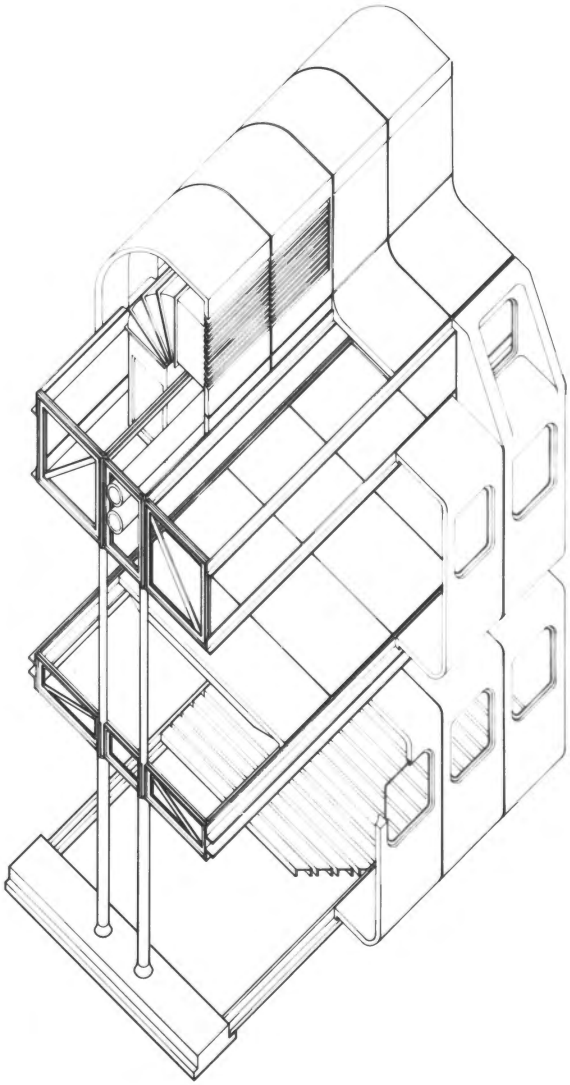


Figure 10

ASSEMBLY

In each of these explorations there is always present an underlying responsibility to the greater whole. It is from this whole that the items derive their life and eventually crystallize into the specific, into the barn.

There exists also a responsibility to the practical and symbolic history that determines the barn's use as a device of enclosure, of separation, or of the enclosed. It begins as a single device of the enclosed. Its response is to that which it protects and contains.

As the activity increases not all things can take place within and the barn now has the additional responsibility to make a place other than within itself. It acts as a device of implied place as an enclosure. Again the farm's activity changes and grows and becomes more specialized. The barn responds as a device of separation and organizes a range of actions both within and external to it.

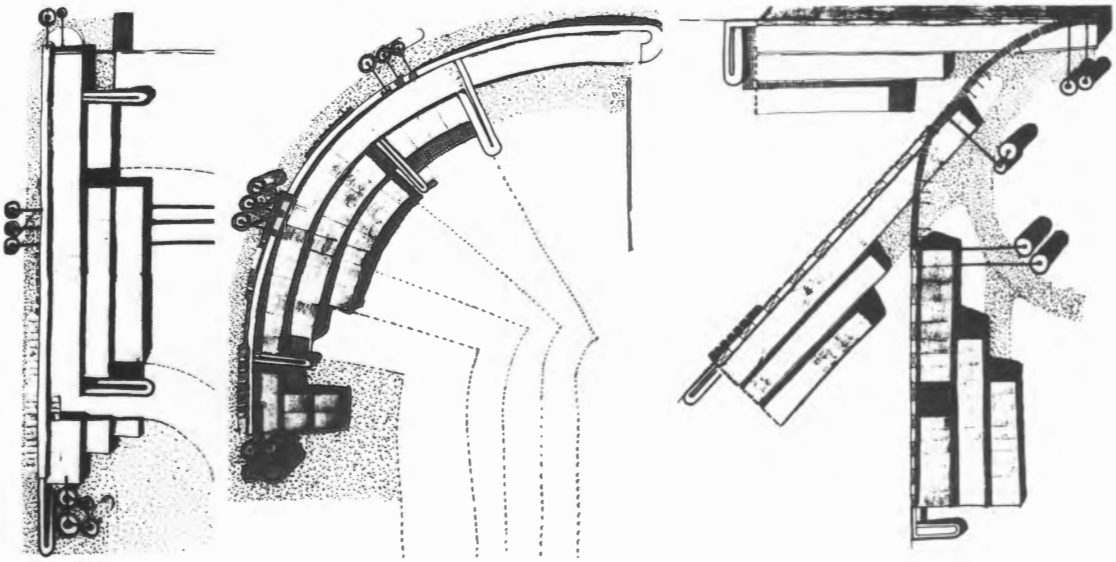
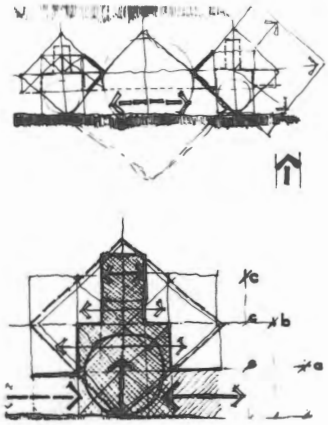


Figure 11 ALTERNATIVES



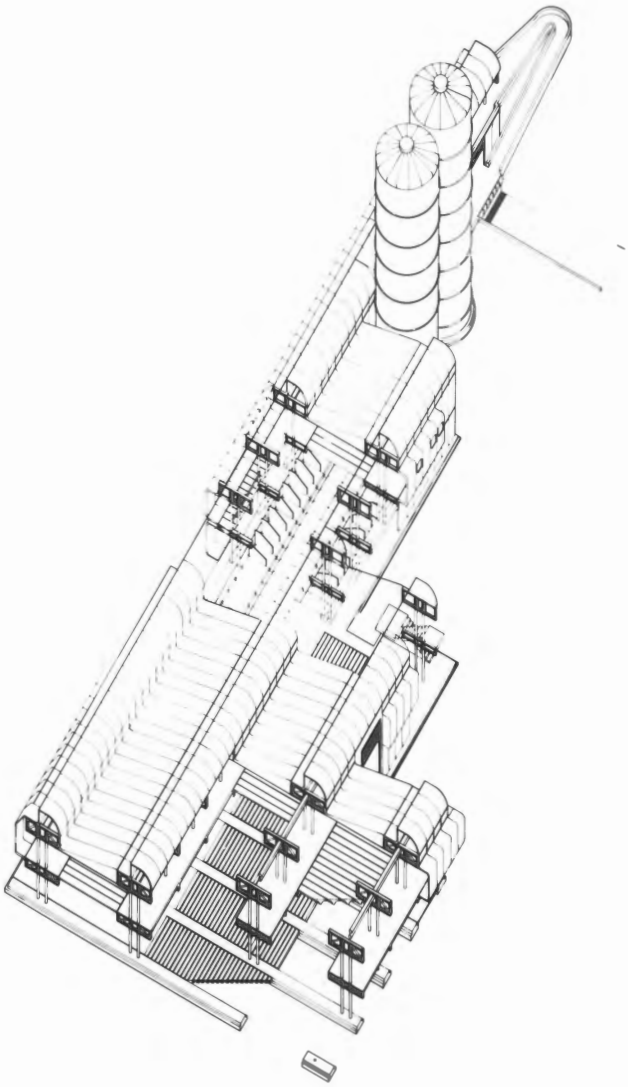


Figure 12 THE BARN

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(ABSTRACT)

The exploration of two buildings for the use by plants and animals incorporating similar structuring and checking devices. A vertical field for the cultivation of crops and a fiberglass "Barn" for livestock confinement are discussed in terms of each other, in terms of farms and farming historically, and in terms of farms and their relationship to the development of the church cloister. Each of the discussion categories function as checking and direction devices to support the projects development.

A selection of drawings, investigation papers and photographs visualizing the two projects are also included.