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### Consistency in Community Identity: Pueblo Bonito, Chaco Canyon, New Mexico

Robert Haley

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ESSAYS PRESENTED TO  
D. KENNETH SARGENT

THE SCHOOL OF ARCHITECTURE  
SYRACUSE UNIVERSITY SYRACUSE, NEW YORK

JUNE 1971

## **CONSISTENCY IN COMMUNITY IDENTITY: PUEBLO BONITO, CHACO CANYON, NEW MEXICO**

ROBERT HALEY

*Robert Haley is a graduate of our school who continued further advanced study elsewhere and returned to teach Architectural Design.*

This article serves not to present a totally inclusive report on this Northwestern New Mexico Pueblo, but rather simply to expose this virtually unknown, yet uniquely ordered settlement pattern to a larger number of interested people.

Pueblo structures of the Southwest have gained recent popularity via the environmental consciousness reports. In the N.E.I. program "Multiply and Subdue the Earth," Ian McHarg expands his ideas regarding design with nature through the example of a New Mexico Pueblo today. By choice, and historically by social force, the descendants of the prehistory era of Pueblo culture, live today with a treasured and nurtured value of oneness with nature. The inability of the Navajo to make a decision without considering the contingency effects of that decision on the rest of his world is the result of a way of life dependent on spiritual, personal, and communal consistency. It becomes dishonest to act without regard for the range of the resulting outcome. This view is becoming harder to make light of in lieu of the disastrous effects of popular singularly oriented decision-making processes.

As it is always difficult to look at a particular historical example without a clear idea of the relation and context of this structure to the people who built it, a general presentation of the Pueblo Indian way of life should be given.

The Pueblo culture which exists today evolved through centuries of a relationship between man and nature. This covered the period from about 1 A.D. to 1300 A.D. The Pueblo Indians, for reasons strange to the western mind, never felt the need to seek a level somehow dominant over nature. They found satisfaction personally and communally through consistency with nature, rather than in spite of nature. These people born to the Southwest evolved an increasing understanding with nature. Tradition passed on the knowledge encountered by the previous generation. Increasing sensitivity to the harmony discovered everywhere in nature became the Pueblo order of life.

An excellent article "Place, Form, and Prayer," by Paul Horgan, reveals the following quotes regarding the Pueblo concept of life:

So every act and relationship of Pueblo life included the intention to find and fulfill such harmony. The whole environment found its way by spiritual means into all of Pueblo life. Works of art captured the animal and vegetable and spiritual world—always in objects meant for use, never display for its own sake. . . . the work of art was the act of living. No one part of it had significance alone, just as each feature of the landscape by itself meant less than what all meant and looked like together.

Predictably, water was of a special sacred nature to the farmers of the Southwest. But water served to symbolize, through abstraction, more than just a necessity for growing crops. What water did for crops, i.e. give life, the Pueblo Indians abstracted to a high level of explanation of the spiritual world. Thus that life-giving quality which water afforded was paralleled by a spiritual giving quality. Eventually this abstraction found its final form in the Kiva, or the

sacred room where the natural world met the spiritual world. The actual place or porthole where this connection is made in the Kiva is called the "Shipapu" or "Sipapu." The origin or the tradition of the Shipapu is referred to by Horgan:

Lakes and springs were sacred too, and natural pools. They were the doorways to the world below. If everything originally "came up" with the people through the sacred lake SHI-PAP, the same action could be imagined for other such bodies of water . . . Gods and heroes were born out of springs, and ever afterward came and went between the above and below worlds through their pools. Every Pueblo had sacred springs somewhere nearby. There was every reason to sanctify them—physical, as life depended upon water; spiritual, as they had natural mystery which suggested supernatural qualities; for how could it be that when water fell as rain, or as snow, and ran away, or dried up, there should be other water which came and came, secretly and swiftly, out of the ground and never failed?

The site for a Pueblo was not arbitrary. It had a special quality around and with which a clan of Indians would work towards building a community in harmony with nature and the spirits. Paul Horgan states:

The feeling, the sense, of a place was real and important to the people. Almost invariably for their towns they chose sites of great natural beauty . . . everything in the landscape was sacred, whether the forms of nature, or those made by people—altars, shrines, and the very towns which were like earth arisen into wall, terrace, light and shadow, enclosing and expressing organized human life.

And indeed this special feeling for color, light, and order still exists in the ruins of Pueblo Bonito today. As you walk up to the exterior of the ruins' east wall, about three stories in height, you are impressed by the beautiful color combinations between man-made structure, natural cliffs, and sky. The rich brown of the meticulously laid masonry, for which Pueblo Bonito is known, is a striking compliment for the yellow ocher of the weathered sandstone cliffs. Both texture and color find compliment between the man-made and the natural. Natural weathering and cracking of cliffs in ocher and dark brown are played against the hard-edged repetition of small-scale masonry in rich brown. And both are set on a field of cobalt blue and white. This organization of color and pattern provides an experience believed to be significant to the Pueblo understanding of harmony with and in nature.

But this harmony was not limited only to the visually organized elements. The quality of harmony was basic to Pueblo thinking and served to structure interaction of individual elements in any part of life. The structure of the community organization was carefully evolved to provide a sensitive rule system through which the individuals could relate to the community. The needs of these people were provided for by a code of responsible interdependence. We cannot be sure of exactly how it must have been to live under Pueblo life 900 years ago. However, Paul Horgan gives some speculative insight:

It was an organized life whose ruling ideas were order, moderation, unanimity . . . But the Pueblo people had no ruler; no despot. The irresistible power which ordered their communal life was the combined and voluntary power of the people—all the people, in each town, giving continuity to inherited ways by common agreement.

A key issue in the understanding of the social context within which Pueblo Bonito was built lies in the community's idea of ownership. The physical pattern left in the ruins today suggests an apartment-like structure where the inhabitants did not own a particular part of the structure. Considering that

Pueblo Bonito existed from 919 A.D. to 1130 A.D., according to Marjorie Lambert in "Cities before Columbus," many generations lived in this complex. Again an understanding of communal interdependence became a rule system. Horgan continues:

Everybody, together, in a Pueblo, owned all the land, all the religious edifices and ritual objects. Assignments of use were made by a council of elders. Heads of the families were granted the use of portions of land, which could be reallocated every year, according to change in families through marriage or death. Religious properties were assigned to proper organizations.

Crops grown by families upon their assigned plots belong to them alone. Families owned objects which they made for their use. Families were given permanent possessions of rooms in the Pueblo for as long as the family existed and could build additional space as needed. When a family died out, its apartments were abandoned and went into ruins.

Since property was entirely for use, and not for sale or trade within the Pueblo, everybody lived upon the same scale. Their rooms were alike. Their holdings in food, clothing, furniture, were about the same. Living closely together, they interfered very little with their immediate neighbors, though within the family there was no privacy and no desire for any. Outbursts of feeling, emotion, violence, were bad form, and so was indulgence in authority for its own sake, instead of for the property it was meant to preserve. Nobody was supposed to stand out from everyone else in any connection but that which had to do with official duties.

The essence of the community life of the Pueblo Indians is simply based on a utilitarian use of space and objects as determined by the size and nature of the activity. No extra space or additional object beyond that needed was justifiable; it became excessive and thus not in the interests of the entire community.

But why should Pueblo communities feel so responsible to each of its members? Certainly part of this shared responsibility was due to survival as that is one of the basic reasons for people to group and live together. But another factor may account for the unusual success of this way of life. Early Pueblo structures, in the Basket Maker period from 1 to 450 A.D. and the Modified Basket Maker period from 450 to 750 A.D., provided housing for one family or clan. The Pueblo culture kept the family unit very close together. Thus a Pueblo structure of 25 to 30 units could be in fact one family. It is easier to understand (at least for the Western mind) the individual's extra degree of responsibility when directed to his own family structure. As clans grew by marriage and birth, so also did Pueblo structures. It is not unreasonable to suggest that a structure even as large as Pueblo Bonito could have been inhabited to a major extent by descendants of the clan which had established this community some 20 generations earlier. The family lineage offers plausible explanation for a community respectful and responsible to its membership. The single family lineage community also offers some reason for the self-contained, independent, even isolated public life between Pueblos. Pueblo communities as close as 1500 feet to each other may have never found reason for its people to get together. Traditions basic to Pueblo life varied in detail from community to community. Individual Pueblos, for all intensive purposes, were isolated communities. Yet it seems hard to imagine that in 1100 A.D., when Chaco Canyon supported a population of around 10,000 people, these "apartment buildings" functioned independently. For these residents shared the adjacent farmlands. Presently we have apartment buildings adjacent to one another where exchange is non-existent. But then the reasons for this similarity find little if any parallels.

The feeling for family strength and unity was not just simply for its own sake. As with other things, these people developed a community harmony of which the family was both an external and internal element. The family served as the medium by which its members related to the community. Each family was assigned a part of the responsibility for the community's religious continuance. Every person in a Pueblo belonged to a cult or family unit. Again it should be pointed out that the Pueblo idea of religion was actually every moment and action of their lives. The rituals of the seasons were merely a joining of clans to aid in the scale of the effort of the event.

So there was an in-family scale of religious activity and an out-family scale which shared a religious effort with other clans of the Pueblo. Each clan had a room called the "Kiva," where the men of the clan would go to perpetuate that clan's relationship with the spirit world. The pattern of a Pueblo with many clans would therefore have many Kivas. Pueblos of many clans also had one or two large Kivas of 49-62 ft. diameter, as opposed to the 10-12 ft. diameters of the clan Kivas. These large or "great" Kivas served as collecting, sacred places for the men from all the clans of the Pueblo. There they would make decisions pertaining to the welfare of the entire Pueblo. These large Kivas also served a very important function in that they collected the individual clan's religious efforts and grouped them into a common religious effort of the Pueblo. Special elaborate rituals of the Pueblo require the collective efforts of two or more clans. Paul Horgan explains:

Each Kiva group was dedicated to the ceremonial work of one of the seasons . . . yet certain events, like the great corn dance, called upon two or more cults to perform in the plaza, alternately throughout the day-long invocation of the spirits of fertility and growth, when one group would dance while the other waited to take its place, with all joining at the end.

So the religious life of the people was formalized in groups that separately represented neither the whole town nor a single clan but drew symmetrically upon the population until all were included, empowered in the same terms, and actors of the same myths. Religion was not a thing apart from daily life. It was daily life, a formalization, an imitation of nature, an imagined control of the elements, and of what was obscure in the spirit of men and women.

Thus comfort through organized observances.

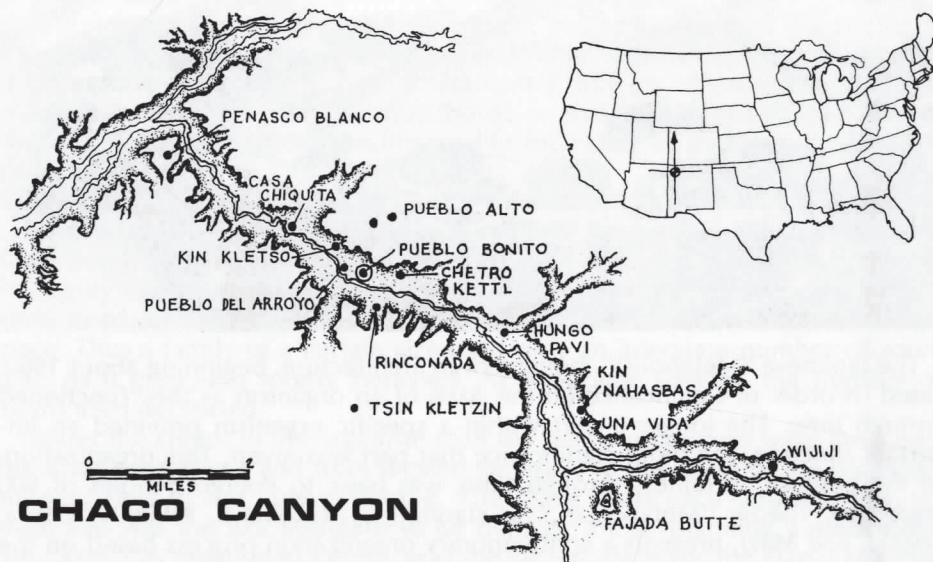
The whole year had its cycle in them.

With this general background of Pueblo cultural development, and an idea of the view with which the Pueblo man perceived his world, we shall look at Pueblo Bonito, as the built manifestation of the Pueblo concept of man's relation to other men, to nature, and to the spirit world.



*Restored ruins prior to collapse of Threatening Rock in the winter of 1941.*

Pueblo Bonito, as a specific structure, is dated by Marjorie Lambert as an active community dwelling from 919 A.D. to 1130 A.D. (Dates vary as to exactly when this Pueblo was finally deserted, but it is generally accepted that total abandonment took place sometime between 1150 A.D. and 1250 A.D.) Bonito was only one Pueblo in Chaco Canyon, a sub-basin tributary of the San Juan river at 6,100 feet of elevation and located about 35 miles west of the continental divider in Northwestern New Mexico. Chaco Canyon runs to the Northwest, feeding a series of washes and rivers to the San Juan, and eventually feeding the Colorado River.



Pueblo Bonito was the largest structure in Chaco Canyon, at one time containing an estimated population of 1,200 people in about 800 rooms. Other Pueblos in a six-mile section of Chaco Canyon provided a total Canyon population stated to be 10,000; the number in itself asking questions of the nature of an essential peaceful coexistence for a people commonly "pictured" as "warring savages." Indeed the quality of life in Chaco Canyon around 1100 A.D. suggests many thoughts on "high-density" community living.

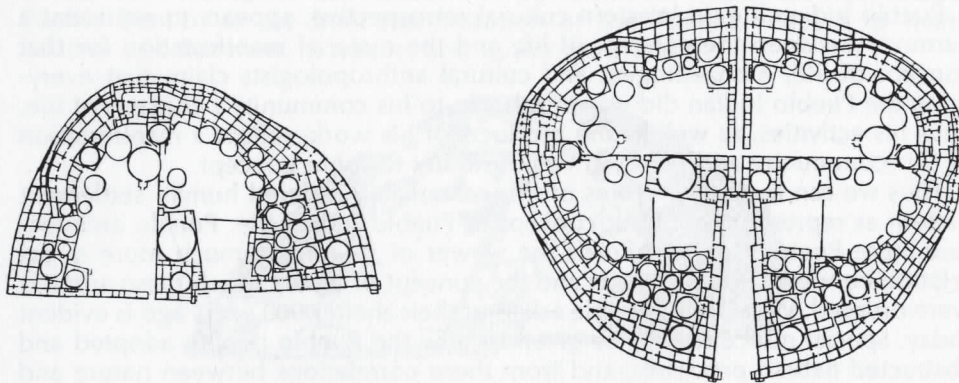
Pueblo Indian life, in Western cultural retrospective, appears to represent a harmony between the concept of life and the material manifestation for that concept of life. Archaeologists and cultural anthropologists claim that everything the Pueblo Indian did was in relation to his community's concept of life. Thus his activities, as well as the products of his work, reflect a manifestation of this community and personal responsibility to a life concept.

Thus we can look at the ruins of this remarkably ordered human settlement pattern as representing a built concept of Pueblo Indian life. Pueblo architecture, here Pueblo Bonito, affords the viewer of its ruins a much more direct relation between found artifacts and the concept of life to which these artifacts were ordered. What these people asked of their shelter 900 years ago is evident today. Special notice should be given to how the Pueblo people adopted and abstracted natural processes, and from these correlations between nature and man how they worked towards their end of providing shelter and meaning for their changing community.



The Japanese "Metabolist" movement in architecture, beginning about 1960, based its order of significance on the parts of an organism as they functioned through time. The longer a part within a specific organism provided an important function, the more significance that part was given. This organization, on the basis of usefulness through time, was basic to Pueblo peoples of 900 years ago. Theory "Metabolism," as clarified by Kurokawa, Kikutaki, Otaka, Isozaki, and Maki, presents a contemporary organization process based on the necessities of coexistence and complex symbiotics. The degree of complexity is greater, but "Metabolism" parallels the concepts governing Pueblo peoples.

The organic pattern Pueblo Bonito represents suggests an analogy with the cross section of a tree or plant stem.





The analogy continues to the parts. The cells at the outer edge of the plant section are small, independent units with a similar relationship to its neighboring cells. Each cell has a particular role to perform to sustain the organism. The cells are many near the outside of the organism. In Pueblo Bonito, as in organic organisms, the cells to the extreme outside are dead cells with regard to activities. These outside cells are storerooms with little, if any, human activity. Human activity, of course, was what determined the life quality of the cell. These outside cells were therefore the symbolic epidermis of the Pueblo organism.

As one moves from the outside of this cross section to the inside, the human activity in the individual cells increases. The cell rooms toward the center of this symbolic organism house families and family activities. A storeroom cell at the outside of the structure would have very little human activity, whereas a cell room on the interior ridge may house as many as 15 people working at a family craft. Cell vitality and life quality increased as they approached the center of the organism.

It should be remembered that the cell of Pueblo Indian culture is represented in both family structure and building structure. As the family grows by marriage, a new room is built to accommodate the new family size. As a part of the family dies or leaves, a room cell may be taken down, or used for some other need, or its use given to some other family who needs the sheltered space. Thus a family of a certain size used only an adequate number of room cells. As it grew, the rooms increased. As it became smaller, the number of rooms used decreased.

Nearer the center of the organism than the family room cells were the Kivas. The Kivas were round and were located generally to the south of the utilitarian building cells of the Pueblo people. The "Kiva" was each family's religious place and was the first structure to be built by a clan planning a settlement. The "Kiva," as mentioned before, was the sacred place for the clan. Each clan had its own Kiva, and a particular Kiva could not be used by a different clan. Once a clan died, the Kiva of that clan ceased to be significant. This becomes evident in the Late Bonito period (around 1150 A.D.) when Kivas of clans no longer existent were used as refuse dumps. This major contrast between sanctity and utilitarianism again makes a strong point to the view the Pueblo Indians held that it was not the structure itself that was sacred but the activity it housed. How immediate the sacred was, then, to each clan.

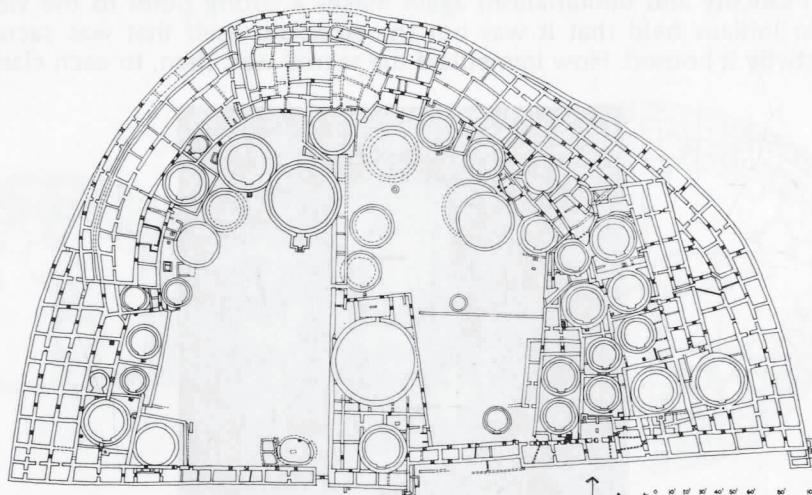


The location and form of the Kiva, in the stem-section analogy, provide additional symbolism. In this stem context, the Kiva takes the form of a vein; a transporter of the basic substance essential to the support of the cells in the organism. In Pueblo Bonito, as in other Pueblo communities, these Kivas did in fact provide for the spiritual base essential to the Pueblo culture and its community as an organism. Where the box-like cells were thought of as containers of food and goods or as containers of activities such as weaving or pot making, the drum-like Kivas were thought of as places of transitions. The spirits of the earth could enter the Pueblo world through the small hole in the floor of the Kiva, and likewise exit to the sky through the smoke hatch in the Kiva roof. The distinction between places of containment and places of transition found form in these box-like and drum-like units typical to Pueblo plans.

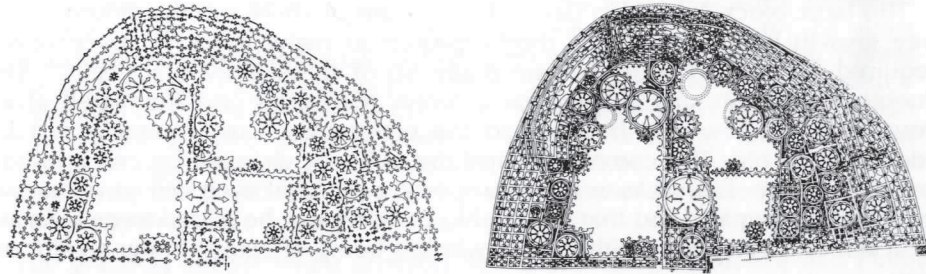
The drawings which follow represent a graphic abstraction of the spatial dynamics of the main floor plan of Pueblo Bonito. Redrawn from Niel Judd's reconstructed plan, the first drawing affords the best idea of the size of this Pueblo at the height of its existence. Consider this is only the main floor plan and that in some places the structure was four and five stories high, one can imagine the size of this "apartment building" in relation to the scale given.

The second drawing attempts to express the spatial dynamics within the rooms of this main floor plan. No material elements are drawn. What is drawn is a representation of the spatial feeling and forces or the perceptual cues toward an overall spatial dynamics as implied and determined by the material elements of walls and wall penetrations. Thus rectangular rooms, the individual cells, set up a perpendicular confrontation with each wall which in turn determines the room center and all positions in that room as relative to that center. The circular rooms, the "Kivas," set up a constantly reversing inward-outward generation, oriented only by the notch, usually in the south position of the circular room. Rooms which are linked together by openings as found in Judd's excavations are indicated as room groups with continuing connections. These room groups may represent clans on the basis of each clan's size. A further sense of the places of containment and the places of transition can also be abstracted from this drawing.

The third drawing is a composite of the plan and the spatial dynamics.

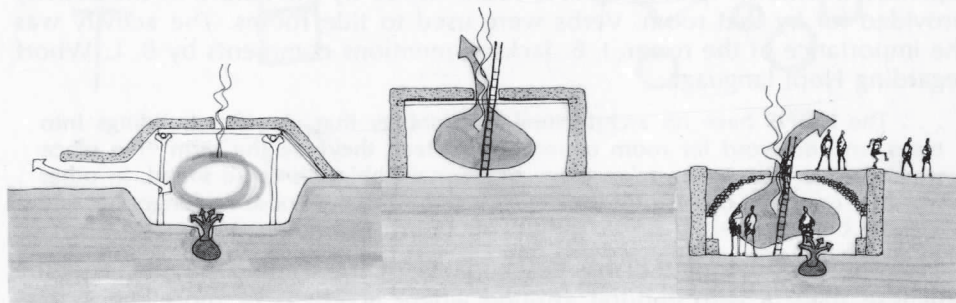


**PUEBLO BONITO CHACO CANYON, NEW MEXICO**



The Pueblo Bonito structure is both a typical example of a Pueblo community and at the same time a complex of unique organization as compared to its contemporaries. As a unique example, Pueblo Bonito in plan form, i.e. the half circle oriented to the south, represents not only a beautifully simple half-dish form, but also presents an image identical to a Jamez Kiva painting of the Pueblo universe. In this sense Pueblo Bonito is the only Pueblo which in its total built form presents an image of the Pueblo concept of the universe. It is not to be assumed, however, that the Pueblo Indians of that time thought Pueblo Bonito of any special significance among Pueblos other than the fact that it was the largest. There was no Super-Pueblo of superior importance. The Pueblo people related to their own particular Pueblo community and not from Pueblo to Pueblo.

As an example of a typical Pueblo, Bonito accumulated its organization and size by the growth process of its basic building cell: the individual room as determined by utilitarian factors such as family size, beam lengths, masonry capability, construction units, and materials available. As indicated earlier, the Pueblo as a formalized community grew from the individual family room. The individual family room evolved from the "pit-house" type, which has been traced back 25,000 years. Gradually the "pit-house" came above ground completely and the previously inward sloping side walls became vertical. The wall construction also evolved from sloped wooden poles set at close intervals and heavily plastered with adobe, to poles in a vertical position again covered with earth, and finally to masonry walls. It should be noted also that the pit-house had all the elements of the later evolved Kiva; the Shipapu, the smoke vent later to become the entrance, and the antechamber later to become the ventilator.



The Pithouse.

The Cell.

The Kiva.

This basic block, limited in size by beam spans of 10-14 feet (by nature of the tree growth in the area), was then repeated as many times as space needs required. All Pueblo structures are made up of these individual "cells." The Pueblo community and its physical complex then grew and fluctuated at an equal rate. As new members joined the community, new rooms would be added to the old. The community and the building changed by cell addition and subtraction. J. B. Jackson makes a special point that each cell or room was built by its occupant, and that the Pueblo building can be added to or reduced by a number of rooms, without the whole's being affected in any significant way.

The Pueblo structure, with its close packed rooms and high walls with ladder access to its rooms, is not the result of need for defense. Nor is it the result of a shortness of land suited for building. It grew as a surrounding by its community members of a sacred quality of life. This sacred quality of life by right was to be experienced by its citizens throughout all their activities. Thus the community activities needed to be seen and heard by all the people. And for this reason, a symbolic surrounding of the Pueblo spirit, Pueblo structures evolved into terraced enclosures of a common plaza.

With this idea of a growth by cell addition goes the implication of the lifespan of that particular cell. Since each cell (room) was built by a particular family, the continuing viability of that cell was directly related to the viability of the family using it. Since families change size quite frequently, with births, marriages, and deaths, a rather short cycle of change in family size seems logical to assume. This idea of family size impermanence is expressed in the construction technique used to build the basic room unit. Investigations into Pueblo structures of Canyon de Chelly, by Cosmos Mindeleff, indicate that the only intent of the construction of a Pueblo was to enclose a space. No foundations were built; no consideration for thrusts or accumulative weight problems were dealt with, except in the case of repair of a failing structure. J. B. Jackson states:

The Pueblo Indians were not concerned with building for posterity. They built their houses to satisfy an immediate need. The need of a lifetime or perhaps two. They never intended to erect lasting monuments and consequently never learned how.

. . . permanence is not sought after and immediate use of a building is all that matters. Outward appearance would seem to count for nothing.

As a result of this concept there was no institutionalism of architectural types. The importance of a structure was simply to provide a place for a specific activity. Some interesting cross references can be brought to bear here. The Japanese traditional house provides room names by the nature of the activity provided for by that room. Verbs were used to title rooms. The activity was the importance of the room. J. B. Jackson mentions comments by B. L. Whorf regarding Hopi language:

. . . The HOPIS have no architectural terminology that classifies buildings into types, and no word for room or interior. Instead they use the term "the place where"—a certain action takes place or a certain object is to be found. In other words, if an action ceases or if the object is removed, the house no longer has any identity.

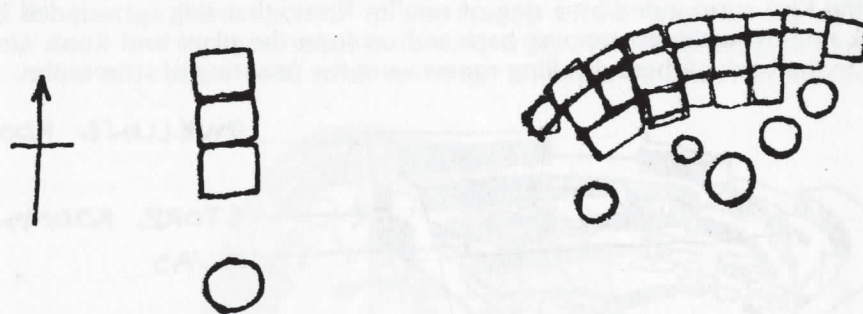
Here both the Hopi Indians, descendants of the Pueblo people, and the Japanese share a verb cultural attitude where action is of more merit than object. Jackson continues his point regarding the repetition of actions being in itself worthwhile to the Pueblo mind.

... The basic structural unit is not the house but the room. It is worth emphasizing that growth consists of an indefinite repetition of this basic unit. To quote Whorf again, the belief in the cumulative power of endless repetition also inspires the Pueblo Indian ceremonial dance with its 'short, piston-like tread, repeated a thousand times.' And perhaps we can even see a manifestation of the same trait in that marked Pueblo Indian preference—noted by Mindeleff—for small stones instead of large ones; so conspicuous at Chaco Canyon. It is as if the builders were saying that a wall is sturdy when it is made out of a multitude of identical small fragments.

The practical analyst might interject here that it is also possible that Pueblo Indians were not basically engineers, and might not have been able to use stones larger than they could carry to the place of construction. Later it will be mentioned that the reason the Pueblo Indians were forced to abandon Bonito and all of Chaco Canyon might have been their inability to engineer a device to raise water to their farm lands. The cultural attitude of continuous growth patterns and actions, as revered by Pueblo people, would not justify the idea of engineering a solution to a problem; for engineering is a complex process of taking many steps at once to reach an eventual and possibly unrelated end of major change. The Pueblo mind might not have found this approach consistent with their immediate contact and interaction with nature and its processes. In other words their cultural composite may not have allowed the evolution of major engineering.

Pueblo life, therefore, was activity oriented. Each activity was related to nature and to the spirits. The organization and form of these activities were abstracted from observations of nature. In the building process and form the Pueblo Indians abstracted their understanding of natural organic growth order. Organic patterns are reminiscent in masonry patterns as well as in plan organization and addition patterns. The Pueblo concept of strength, as mentioned earlier, was achieved through repetition.

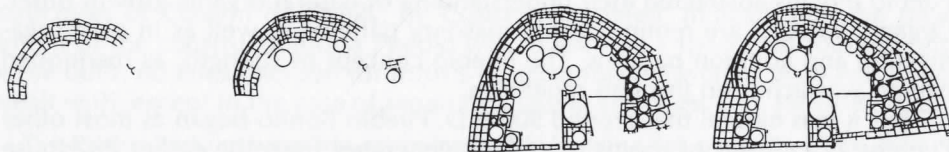
Thus it was natural that around 900 A.D. Pueblo Bonito began as most other Pueblos as a cluster of rooms or cells as generated from the earlier Pit-House unit. Previous generations had established a system of orientation which located a family's rooms in generally a north south line, with store rooms to the north and family rooms to the south. To the extreme south of these rooms was located the Kiva for that family.



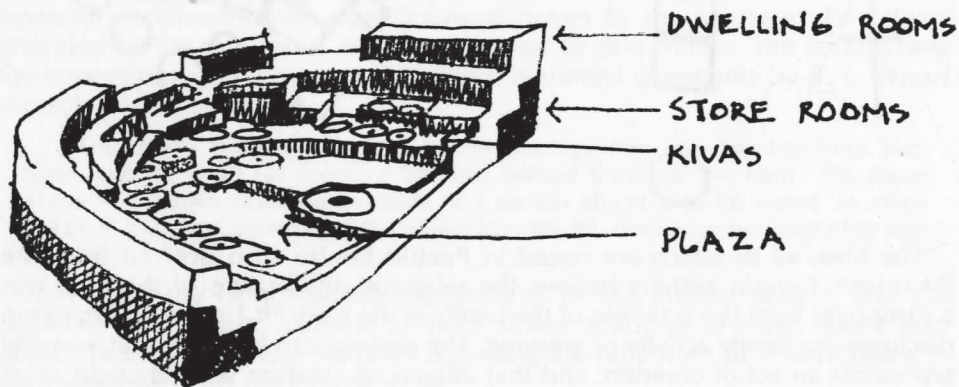
The Kiva, all of which are round in Pueblo Bonito, also evolved from the Pit-House. Certain authors believe the religious significance of the Kiva was a carry-over from the activities of the family in the early Pit-House. Wormington discusses the family activity of weaving. The analogy can be made that weaving represents an act of creation, and that all acts of creation were thought of as

born in the original manner of passing from below through the Shipapu. Thus weaving was a religious activity. The Pit-House almost always housed this symbolic birth process, whatever form it took.

When the Pit-House evolved, two distinct rooms grew from it: the box-like room as the basic building block of the Pueblos, and the Kiva, as the sacred place apart. As the community grew and new rooms were added, always keeping the traditional orientation of Kiva to the south, or community side, and the rooms symbolically protecting the Kiva to the north, the space available to keep these traditional rules became less. What was a basic rule of house and Kiva organization for the single clan, could not grow indefinitely. An important and overriding rule of spatial organization was that the entire community needed to share an equal relationship to the common plaza. Events of the plaza had to be viewed and heard by the women and children of the community. Since the ground area was limited, on the basis of these two organizational rules, house-to-Kiva orientation and community-to-plaza position, new building space was found on top of other structures. Families added rooms on top of what they had built many years before. What was two-dimensional organization became three-dimensional. It is believed that rooms beneath the new rooms became storerooms. The boxes stepped up, away from the Kiva, leaving terraces overlooking the Kiva area. As the complex grew to the west and east to form a semi-circle, the area to the south containing the Kivas became a large plaza, surrounded to the north by, first, a half ring of Kivas, and then a concentric half ring of terraced rooms. The plan became almost a perfect half-circle with the flat side facing south.



In its final state of development, which is represented by the ruins left us, Pueblo Bonito simplifies to a concentric organization of a plaza with a large central Kiva surrounded by a ring of smaller Kivas; that ring surrounded by a thick ring of swellings stepping back and up from the plaza and Kivas. Under and to the back of these dwelling rooms were the final ring of storerooms.



The half-circle plan is not typical of Pueblo structures. There is, however, a definite sense of the concentric order of growth. Most Pueblos of Chaco Canyon exhibit a sense of concentric order, but nowhere is the half-circle plan repeated.

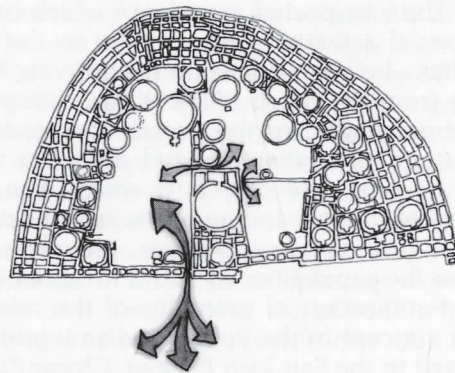
J. B. Jackson, a most interesting landscape historian, speaks of the Pueblo concept of concentricity:

. . . they protect a valued object by surrounding it as many times as possible; the content, whatever it may be, is safeguarded by being placed in a whole series of concentric circles or walls . . . the most sacred object in the Kiva is a small orifice in the floor called the Sipapu. The Kiva exists to house and protect the Sipapu. Frequently the horizontal bands on the wall of the Kiva are meant to symbolize enclosing walls, encompassing the Sipapu several times again.

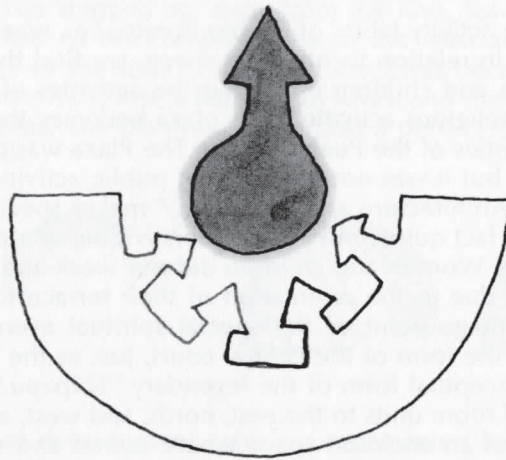
(Regarding the planting of the corn)

The first kernels (of corn) are planted with appropriate rites and prayers in the center of the field; at a spot where there is sometimes (according to Daryll Forde) a boulder serving as a shrine. After this is done the remaining corn is planted. But the kernels in the center are the vitally important ones. The Navaho are even more painstaking—or used to be. Father Berard tells how they used to plant their corn in a spiral, beginning at the center.

If we abstract the activity fabric of Pueblo Bonito, i.e., where to imagine the variety of activities in relation to others in space, we find the daily, domestic activities of women and children encircling the activities of the men. Family activities surround religious activities. The plaza becomes the visual center to which exterior activities of the Pueblo relate. The Plaza was the visual orientation of Pueblo life; but it was not the place of public activity. J. B. Jackson, in his article "Pueblo Architecture and Our Own," makes special notice that the Pueblo "Plaza" is in fact quite unlike our understanding of a plaza. It was not a center of public life. Women and children did not work and play in this area. They did, however, due to the orientation of their terrace to the open court, have a constant vantage point of the special spiritual events of the Pueblo community. In fact the form of the central court, just as the form of the Kiva, also reflects the conceptual form of the legendary "Shipapu." This large open court, with terraced room units to the east, north, and west, and a straight wall to the south, formed an enclosed space where sacred and mysterious rituals were performed. And for this large open area, only a small opening was provided for passage from the "in" of the Pueblo to the "out" of the Chaco Canyon floor. And again as subcults formed within Pueblo Bonito, subcourts were walled off, each with its small opening, "Shipapu," to the next subcourt.



Again the consistency is exhibited from scale to scale. The spiritual concept of the sacred (the "in") to the natural world (the "out") is manifested in the physical structure to house and perpetuate that concept. The unknown spiritual significance which came through the Shipapu to the Pueblo Indians was symbolized many times over in the structures of Pueblo life. It is not unreasonable to draw analogies of recurring events which seem to parallel the idea of the Sipapu. For instance, the occasion of the heavily decorated men coming up the ladder from the little hole in the Kiva roof, chanting and dancing, certainly evoked a special spiritual meaning for the women and children watching from their terraces. Even when the men stayed down in the Kiva, which also served as their men's club, the sound from the root drums and the rising smoke must have been very mysterious to the viewers. The "Plaza" was another increment in the scale of abstractions to which the concept "Shipapu" was drawn. This plaza was the place where the dancers acted out the rights of the seasons. The plaza became a mysterious stage exhuming symbolic excitement. The entire Pueblo structure, in fact, became the porthole of the story of the mystery of life taking place on the Plaza. The surrounding dwellings became the Sipapu holding the spiritual activity of the court.



Contemporary analogies of symbolic experiences can easily fit into this organization of the relationship between event and the individual observer. The Woodstock rock festival experience certainly at times transcended to a spiritual level symbolic of the simplest reality of that life quality unique to man, i.e., the mysterious joy of life. The unexpected experience which comes from within a group, sharing in a special activity may be similar to the quality of mystery which the Pueblo Indians believed came from observing the decorative and active dances pouring from the hatch of the Kivas, filling the usually empty plaza. The individual's perception of the experience produced by the group becomes something commonly collective, and indeed a real thing in itself. This intangible reality becomes the object by which man, past and present, attempts to transcend to his understanding of the superhuman reality. Spiritual simplicity seems to vary little between peoples, yet religious ritualism seems once again to represent the capabilities of man's imagination.

Continuing in the identification of examples of the model "Shipapu," the largest example of this concept in the Pueblo Indian world is found in Chaco Canyon itself as it related to the San Juan Plateau. Chaco Canyon was the "in"





which provided water and food and protection for thousands of Pueblo people. The San Juan Plateau of 900 years ago was most likely much greener than today's barren dirt plateau, but in comparison to Chaco Canyon it was considerably less advantageous as a place to live, and thus provided the symbolic "out" of this scale of the "Shipapu" concept.

Returning to the flexible, three-dimensional fabric of rooms built up of individual cell units over time, Pueblo Bonito in its final state before abandonment provided semi-circular habitat of about 800 rooms and 40 to 50 Kivas. The cell as the unit of growth was easily built; but how was it handled once it outlived its initial purpose? As mentioned earlier, room use was determined by a group of elders. But if these heavy masonry rooms were to be used by one clan for a number of years and another clan at a future date, how could these rooms be connected, blocked up, and then possibly reconnected? Usually in the center of a cell's masonry wall, a door or opening was provided to connect the new cell to the rest of the cells of that clan. Timbers would be used to support the masonry over the rather small opening of three to four feet in height and 18 inches to three feet in width. A cell could be built with no openings in its four walls and be linked to other cells by a hole in either the floor or ceiling. The masonry openings were basically of two types: the opening which went all the way to the floor and the opening which stopped 12 to 18 inches above the floor. On the large plan drawing of the abstracted spatial dynamics, the connection sets of cells are drawn as suggested by the openings uncovered by excavations in the 1920's and 1930's. It should not be assumed that these cell sets were always in this same organization. This can be verified by the fact that many openings in the masonry walls of Bonito are filled, obviously due to the reapportionment of room uses. A new clan was given the use of an adjacent room previously used by another clan, and the old access had to be blocked. In effect these openings were opened, closed, and reopened many times over the 300-year life of Pueblo Bonito. This apartment complex was changing internally to provide one clan with four rooms and another clan with 12 rooms.



Two examples of corner openings, evident today in the ruins of Pueblo Bonito, give us an idea of the easy flexibility the Pueblo Indians thought their structure afforded. These openings go diagonally through the corner of four adjacent cell rooms.



In a masonry structure with two-foot-thick walls it seems exceptionally difficult to provide an opening connecting opposite rooms, not adjacent rooms, at a corner situation, unless the overriding understanding of the system is to provide three-dimensional flexibility, rather than material building fixity. And indeed this is what the Pueblo people asked of their shelter: spatial flexibility. Pueblo Bonito is an example of close-packing, three-dimensional flexibility which served its tenants well.

The abandonment of Pueblo Bonito, and for that matter all of Chaco Canyon, came as a result of a natural cycle too long in time for man to adapt to. The changing cycles of precipitation over hundreds of years was beyond the perception of Chaco Canyon habitants. The livelihood of Chaco Canyon communities depended upon farming. And of course this farming depended on water. But to the pre-engineering people of Chaco Canyon the water had to

be easily accessible. And for the major building period of 700 A.D. to 1000 A.D., water for farming was easily diverted at flood times to irrigation systems capable of sustaining the moisture required. But the amount of yearly precipitation was at a low in this period when compared to the present precipitation of Chaco Canyon. It was not simply the low amount of rain which caused the problem. In fact, there was enough rain even at the lowest point of annual rainfall to support a population of 18,000 people in Chaco Canyon. The problem was in the vegetation cycle which was responding to the precipitation cycle, but at a different rate.

If we take the present amount of precipitation as a mean (from a 1934 report by R. G. Fisher), it can be seen that rain was on a decline from about 4 percent below the mean around 300 A.D. to the lowest point of 38 percent below the mean around 720 A.D. Yet this was still enough rain to support a population almost twice that in Chaco Canyon at that time. R. G. Fisher explains the precipitation-to-vegetation relationship:

From 300 A.D. to 720 A.D. the precipitation and vegetation were both decreasing. However, due to the lag in plant reduction, the precipitation probably did not greatly exceed the quantity that could be retained by the vegetation. After 720 A.D., the curve turns up again with an increasing precipitation uninterrupted until 1130 A.D. During the interval from 720 A.D. to 1130 A.D., the vegetation could not reestablish itself at a rate equal to increasing rainfall. For this period the precipitation was more than the vegetation could retain. An increased tendency to floods would have resulted. It is probable, however, that floods would have begun sooner than this, about 600 A.D., after the average precipitation had decreased to a point 30 percent rainfall, below the present. The vegetation no doubt became so scanty at 30 percent rainfall, that the precipitation, even in its reduced quantity, could not be held back. With the increasing precipitation and the lag in vegetation renewal, an arroyo would have developed between 800 A.D. and 1200 A.D. The plant covering at the same time was growing thicker. Finally, near 1200 A.D., equilibrium was once more established between precipitation and vegetation; the pre-historic arroyo began to be filled. By historic times, this arroyo had been filled completely and the Chaco was once more free to meander at will over its flat valley floor.

Thus the farmers who lived in Pueblo Bonito did not know that their water supply was gradually dropping lower into a new arroyo. By 1130 A.D. it is probable that the arroyo was 30 or 40 feet deep. To the non-engineering inhabitants of Chaco Canyon this inability to raise water 30 feet forced abandonment of Pueblos throughout the Canyon. Pueblo Bonito was left by all but a few of its people in the mid-twelfth century. By 1250 it was totally abandoned and left to ruin, first to be recorded in history by an army expedition in 1849.

#### POSTSCRIPT

Archaeological expeditions, excavations, restorations, and consequently reports have a way of producing an impersonal cultural and historical anonymity. It is to our discredit that when discussing peoples of a past era, we make an attempt to dehumanize the peoples for the sake of classification. Two delightful stories I've run across have made the Pueblo people of the Southwest very real and not just subject for classification.

When the Pueblo Bonito excavation team began to organize the remains of the Bonito area in the 1920's, they were astonished to find a refuse dump of potsherds and discarded artifacts which defied the established concept of

southwest Indian cultural chronology. A great mystery evolved as a counter culture was being unearthed. Artifacts found at the top of the refuse pile, in all cases thought to be the most recent left by their users, seemed of a very old type. As excavations continued these people at Bonito appeared to be very much less advanced in traditional domestic crafts than their contemporaries, and in particular their contemporaries in Chaco Canyon. But as the test holes in the refuse pile became deeper it appeared that a more advanced stage of craftsmanship existed farther back into time. A reverse chronological pattern became apparent. Artifacts usually found at the bottom of such refuse piles were found at the top, and vice versa. Finally the pattern was so clearly a reverse chronological sampling of artifacts that it became apparent that the people of Pueblo Bonito had moved an older refuse pile to this, a more advantageous location. They moved the old pile to its present location by taking refuse from the top of the old pile; thus accounting for the most recent artifacts being found at the bottom of the present pile and the oldest artifacts being found at the top of the pile. Thus these Pueblo people by simply relocating a problem pile from one place to another caused some very sophisticated minds to be quite perplexed for some time.

Another established cultural theory was identified in the Mesa Verde area. Excavations in that area had unearthed two distinctly different human skull types. Archaeologists had classified a long narrow skull type for the people prior to the eighth century, and a radically different, broad skull with a flat area on the back, for people through and after the eighth century. Researchers of 50 years ago were forced to assume that a new race or group of people, not of the lineage of the early Pueblo people known as Basket Makers, had moved into the Mesa Verde region. Within a short period of time this broad shaped head form had completely replaced the previous narrow head shape. The mystery of this new dominating head shape led to ideas of the disappearance of the Basket Maker people. How else could this drastically different skull type be explained? Skull shapes vary little over many generations; it has been almost a failsafe method of classification consistency. However, failsafe classification methods seem totally unable to account for human nature. This was the case with the Mesa Verde skull-type mystery. Recent extensive analysis of skeletal remains from Mesa Verde exposes no basic difference in bone composition. Continued classification of artifacts established a correlation between types of infant cradles used and this head-shape mystery. It was discovered and substantiated that for some reason Pueblo women changed the cradle type early in the eighth century. Whether for fashion or efficiency, the women began strapping their babies onto flat, hard boards instead of the traditional soft, woven frame cradles with the round pillows. What was a mystery of the introduction of the new skull type now was simply the cause-and-effect resultant of the change-of-cradle type. The soft skull of the infants could do nothing but broaden the head shape on the newly adopted cradle boards; and the reason for this whimsical change of cradle type can never be accurately determined.

These two stories serve to point out the inherent problem of viewing one subject from the context of another: here Pueblo culture as reconstructed in the eyes of the Western mind. Our assumptions can be theoretical projections of a culturally subjective view. By necessity, life styles are identified in relation to those known to the observer. The encounter of sequential information constitutes a specific and fixed cognitive image. The cognitive image changes only in the light of new information or a new point of view and therefore filtering

the information anew. The same information in a different sequential order produces a different cognitive image. It is by this method we have constituted and verified knowledge toward an understanding of Pueblo Bonito.

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