RECAPITULATION AND CONCLUSIONS
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The descriptions of the various buildings and their fragments in terms of their technical evolution made in this dissertation would suggest that space in early Andhradesa had been organised in such a way so as to include secular, political, burial and religious buildings which were connected to the daily private and public life of the people. These spaces were organized by a group of technologists called silpins who were trained in not only technical procedures undertaken by various grades of professional craftsmen, but as Coomaraswamy puts it, they also had: "mental visualization and identification of consciousness with the form evoked, ....". This study has aimed at looking at the details of building traditions which were bound by the injunctions of custom and spiritual concepts as have been found in the various extant buildings. Without emphasizing on the perception of the traditional building practitioners these buildings would appear without the subjective meanings of their context.

The main purpose in the dissertation has been to document the traditions of building technology as available within the pan-Indian development of these traditions by highlighting the different levels of building technology in various historical periods in the geo-cultural entity delineated by us as Andhradesa. The study has opened up new horizons in the rich traditions and practices of building technology that

had existed in raising both simple and sophisticated structures and it is interesting to note that both types had co-existed in almost all the periods of our study. The structures of every day use denoted different aspects of the collective endeavours and experiences, resources and ideologies that nurtured and guided the artisans in society. The evolution of these aspects, it has been observed by us, were not static though their evolution has to be seen within the specific context of a historical and geographical space that our study embodies. Indeed, this specificity was determined to a large extent both by geographical and historical factors.

In introducing the dissertation it had to be explained that technological skills were available to only a few specialized groups of artisans, skilled and unskilled workers whereas, powerful social groups had resources for undertaking the construction of monumental buildings. However, what was important to highlight in the context of India was that traditional knowledge about building technology was brought forth in existing historiography through techniques of conservation and building maintenance that was revealed to us in the colonial period. Therefore, a highlighting of the meaning of science and technology in both the western and Indian intellectual traditions was thought necessary to do at the outset. The aims and methods of how the Evolution of Building Technology in Early Andhradesa was to be organized was also done in this Introduction.

Chapter I began with a detailed explanation of the context of the present study in terms of existing writings on the subject [I.1: Interpretative Space], the geo-cultural background [I.2: Geographical Space], and the chronological framework [I.3: Historical Space]. The review of the writings on the monuments of the pre-independent period
revealed that initially these were travellers' perceptions and consisted of some notes on the form of architecture of the extant buildings. A considerable change was observed in the writings that emerged from the middle of the 18th century in which Indian monuments began to be perceived against their material background though the emphasis continued to be on the form only. A further change was observed in the writings on monumental buildings from the 19th century by both Western and Indian scholars who began to be concerned about giving some technical details of the monuments. The study of indigenous traditions initiated by Ramraz was very helpful in this regard and though British administrators began in earnest a listing and descriptions of monuments in their outward manifestations, they now could not do so without consultation with the living traditional architects. We observed that the South Indian monuments received little attention up to the latter half of the nineteenth century though the Archaeological Survey of India was established for the purpose of listing and documenting historical monuments on an all India basis. It was only during the 20th century that the administrator-scholars started writing on new monuments at a regional and local level.

Several significant contributions in studying the South Indian monuments were, however, made by scholars from the early twentieth century onwards. At the same time, a good number of śilpa texts were published during the early half of the twentieth century opening new vistas of knowledge into aspects of traditional methods of building and on their terminology. The writings of scholars like A.K.Coomaraswamy began a significant trend to not only document the material context of the buildings but also highlight its intellectual achievements, aesthetic
values and inward manifestations. Stella Kramrisch and P.K. Acharya made commendable efforts to describe Indian religious buildings supported by the perceptions of the indigenous texts. It was, however, noted by us that the monuments of Andhradesa received a little attention during the first half of the twentieth century from this perspective.

In the works of the post-Independent period monuments were prolifically studied by both Western and Indian scholars with special attention to the regional context. Some aspects of building technology formed part of the discussion in the works that emerged from the 1970’s onwards. Our review of these works also revealed that techniques of how religious buildings were made received maximum attention whereas the simple housing structures and even forts had been sparsely discussed from the technological point of view. This review further established that no singular study with a focus on building technology of different types of buildings in the context of early and medieval Andhradesa had been undertaken clearly establishing a space for our endeavours in the present dissertation.

In Section 1.2 we attempted to locate the historical buildings against the geographical background to study building technology by dividing the area of study into four sub-regions delineated as A, B, C and D. The geographical locale of the Andhradesa as delineated in our study had no rigid boundaries over time. Therefore, we noted that the present day linguistic boundaries of the state of Andhra Pradesh were too restrictive. Since a number of changes took place in shaping the cultural identity of this region right from the early historical times, we attempted to highlight these as could be culled from ancient and medieval literature and
The nineteenth century definition of Sir Greirson who defined Andhradesa based on its linguistic affiliation to the Telugu language indicated for us that the cultural boundaries of a region had to take into account areas of bilingualism also. Further, these boundaries also coincided with important geographical boundaries which we highlighted to take a more flexible, at the same time, contained geographical space for the present study. This was followed by dividing the broad geographical area of our study into four sub-regions which helped us highlight the topographical differences in each of these sub-regions. Different types of buildings built in various materials that were available only in a particular sub-region was possible to contextually place in the present survey. In this way technological variations of the adjacent areas to Andhradesa could also be taken into account. This survey study further enabled us to locate the possible old landscapes against a physiographical background that necessarily looked at its relationship with the present day surviving monuments and buildings. In the next Section [1.3], the period of our study was divided into a four period classification delineated as Period I, II, III and IV for understanding the evolution of building technology in the context of historical space as interpreted by different scholars. It is now recognized in history writing that changes occurred in the political, social, economic and ideological spheres and these are to be studied in an integrative manner. Thus we highlighted the views of scholars in this regard to emphasize that from time to time socio-political, socio-economic and socio-ideological changes form a necessary backdrop for understanding their impact on the evolution of building technology.
The Chapter on Secular Space [II] focussed on habitation and public utility structures especially those pertaining to irrigation networks. We began with how proto-historic people had lived in man-made pits cut into the ground during the early neolithic period and then moved on to the plains and built simple houses. The Neolithic-Chalcolithic people realised the need for some public utility structures. Of these, a pathway for communal use laid for the first time, as noticed at Ramapuram in sub-region D, forms the first public utility structure in the proto-historic context denoting a collective effort. During the megalithic phase, houses began to be built with non-perishable materials such as stone. This was possible since they knew the use of iron technology for quarrying and dressing the hard stone. Overall, during both these phases of human habitation circular and rectangular houses were built with wattle and daub and mud walls and thatched roofs supported by wooden posts. This type of house is still built in most parts of the forested and coastal areas of present day Andhra Pradesh. Significant developments in the building technology of this phase was the considered paving of floors with stones to arrest dampness, construction of platforms to keep utensils, the building of granaries to store food grains and the building of enclosure walls for safeguarding the habitation. Evidence of the use of sun dried bricks for habitation buildings have been found recorded for the first time at Gandluru belonging to this phase.

Period II was characterized by the emergence of State and urbanisation. These changes taken together resulted in raising sophisticated buildings for the rulers and the rich whereas simple structures for the common people continued to be built. The wattle and daub walls of the earlier period were perfected as mud walls, and in some
cases, these were replaced with well-burnt brick walls. The rooms made were bigger and began to be partitioned with verandahs on the front side being provided. The floors were paved with bricks and stones tiles and were used for roofs though thatched roofs also continued to exist. Most of the early historical settlements were connected by well-laid out roads meant for inter- and intra-settlement communications. Another landmark in the history of building technology of the period was drawing water from wells sunk into the ground which were built with bricks sometimes, lined with terracotta rings. These were located very close to the habitations. Concealed and open drains and sewage lines were laid and connected to pits cut into the ground and also lined with terracotta rings. All these aspects denote that town-planning of the period developed along with improvements in building technology.

Surplus in agriculture resulted in the proliferation of various crafts. To house these, workshops were built both in stone and brick. Public utility structures included theatres, stadia, bathing ghats and roads. The present study also corroborates the archaeological evidence of the plans and types of sophisticated buildings with the literary descriptions and sculptural panels of the period. The builders were experts possessing sound knowledge in building technology that they provided built-in space to the people in accordance to their needs. The discussion in this Chapter also aimed at locating the existence of the traditions of building simple structures with naturally available ecofriendly material for which there are no written records. This is one period in early Andhra history when data on these dwellings is available to a considerable extent.
We explained the reasons for the absence of habitation and public utility structures for Period III in terms of the collapse in stable empires, urban decay and decline in trade. We further noted that most of the habitation structures of the period were superimposed by later day occupations in contrast to the surviving examples of the religious structures for the same period. In this regard, therefore, a study of simple housing structures became difficult. Wherever possible the use of literary and inscriptive sources indicated for us the continuing traditions of building technology and materials used for construction. In these circumstances to analyze the level of technology systematically on the basis of extant material evidence was not possible. This lack also raises pertinent questions about the nature of medieval archaeology in India and questions of site definition in this regard since archaeologists have hitherto mainly concentrated on a study of temple sites. Period IV in Andhradesa was characterised by a revival of urban centres and market towns, expansion of agricultural settlements and the unification of minor Kingdoms into a single political unit under the rule of the Kakatiyas. Nonetheless, we only have a solitary example of a public utility structure which was noticed at Motupalli built with bricks with its walls plastered. Post-holes in the structure and the remains of tiles denote that the structure did not show any significant change in technology as observed in the earlier examples. As mentioned above the absence of evidence for common dwellings is marked for this period too and, further, the nature of habitation buildings for this period was heavily dependent on descriptions found in epigraphs and literature.

In Chapter II.2, we have discussed the building technology of the
irrigation structures which were financially supported for construction by both the State and private individuals. This support was mainly linked to an improvement in agricultural production. Though the earliest Brahmanical literature provides us considerable information on the terminology and types of the irrigation structures, in Andhradeśa we have the extant archaeological remains of man-made irrigation structures from the last phase of Period I only in the form of large tanks as noticed at a good number sites in sub-regions A and B. It was only from Period II onwards that literary and epigraphical sources speak much about these structures in terms of their technical aspects. For sites located on the hills, the people scooped the hill surfaces into cisterns so as to store the rain water. A channel meant for irrigation was excavated at Nagarjunakonda in trapezoidal section much like how present day irrigation canals are being excavated.

A significant achievement made by the technologists in planning tanks on hills by scooping the rock was made in Period III. Here the scooped tank also had a masonry dam besides as underground channel for discharge of excess water using rock-cut technology. This was an advanced technique used to tap the rain water and its durability for future use is marked by the fact that it is used even today. In Period IV, large number of lakes with massive earthen bunds designed with spillways resembling the modern dams have been discussed by us. The present study has thus revealed that tanks and dams, often lying between two hills were judiciously located during the Kakatiya period. The literature and epigraphs of the period also mention the criteria for selecting suitable sites for water control systems. The massive dams were built by the financial support rendered by
royalty and, on the other hand, minor irrigation works were taken up by the local rulers and wealthy individuals. The study thus explains that most of the people preferred to build medium scale irrigation works in various geographical zones. This should be a lesson for today's engineer because major dams today threaten many ecological areas and cause more damage than benefit.

While studying the building technology of the defence structures in the Chapter on Political Space [III], we have argued that fort making was primarily related to the nature of the State and the political ideology. Infact, these have been built only after the emergence of full-fledged State though we have evidence of people defending settlements by erecting barricades even in pre-State society. Therefore, it was in Periods II and IV that strong states operated their defence mechanism through the forts built in various material like mud, brick and stone. Most of the forts in Period II were built on the plains. These were circular on plan built in mud which were later perfected by brick revetments.

Though Period III of our study saw political disintegration, some new techniques were evolved among which mention can be made of a rock-cut fort at Gandharikota, forts built in water called Jaladurgas at Divi and Kolleru and finally, forts built of wood called Bovakottams. The last category of forts were built by a tribe called the Bovas who had controlled some areas around the present day Nellore district. They built their strongholds using simple and primitive technology with wood as building material inspite of its malleable nature. The study also finds that both sophisticated and simple technologies existed side by side and the
availability of resources played a vital role in shaping the defence structures.

In Period IV, as State once again became strong as a result of the political unification of entire Andhradesa, many defence structures were built and the operation of defence mechanisms also became sophisticated. Small sized forts continued to be built by the local Chieftians. The contemporary literature offered valuable information on the importance of the defence structures, their types and how they were to be built. With resources and a strong political ideology of centralization, the building technology of defence structures reached its climax during this period. One can observe these features of development at the Warangal Fort where the fort was built in three concentric circles. The outer most ones were of earthen material and the innermost one was built with stone. The provision of deep moats, guard rooms, gateways, and battlements on the fort wall speak of the defence strategies in medieval times. Thus Period IV can be assessed as a culmination of resources, technology, ideology and management of manpower in making these massive defence structures in Andhradesa.

Chapter IV embodies a discussion on the building technology of various types of funerary structures built in areas outside the habitation called burial space. These are found only in Period I of our study as later burial practices in early India changed considerably. The dead were buried below the ground due to the fact that decomposition of the mortal remains had to take place in the first stage. To commemorate the dead people built structures above the ground. In the earliest examples simple and primitive
technology was used in making pit circles. Later these were perfected by filling the cairn around the burial. As the megalithic society, often called a Chiefdom society, became complex certain professional craft groups emerged. Hundreds of stone cutters and dressers, besides ordinary labourers, were put to task in the erection of the huge stones for funerary structures called dolmens, denoting a collective effort and organisation of the personnel. The shapes, sizes and types of funerary structures were largely effected by the geology of the region.

The study in this Chapter emphasizes that the megalithic people were the first to use iron technology and this made it easier for them to extract stone to erect the massive funerary structures. Some of these early techniques of working on rock became part of the collective knowledge that made possible construction of stone monuments particularly stupas and silāmanḍapas in Period II. Infact, it would be appropriate to conclude that many of the traditions that were effectively used to scoop rock and cut hard stone were learnt in megalithic society and perfected in later periods.

In the Chapter on Religious Space [V], the structures which were built for religious purposes have been dealt with under three sections: rock-cut, brick and stone monuments. The study reveals that man used natural caves to live in during the pre- and proto-historic periods. The importance of caves because of their calm and secluded nature soon came to be preferred for religious pursuits. A further increase in the value of these caves for religious recluses led the making of artificial caves by cutting into the rock at several places in Period II. Cutting the rock was initiated during the 3rd-2nd centuries B.C. by the Buddhist patrons to facilitate the monks
We have pointed out in our study [V.1] that rock-cut technology was initially influenced by techniques used in the caves in Bihar and then by those followed in the western Indian examples. Cut-out monoliths were also made for religious purposes. We have also discussed the process of making rock-cut monuments and the probable techniques used based on the evidence coming from some unfinished caves. Rock-cut technology was basically effected by the increase in wealth and availability of a group of experts in cutting the rock and finally, the patronage of the royalty, the local Chiefs and the merchant class. In our opinion, the main reason for developing such permanent structures, even though the technology was difficult, was the experience of the past in which most of the then wooden structures were effected by weather and prone to quick destruction. In the initial stage the rock-cut monuments were excavated in the wood-carvers technique. However, it is significant to note that rock-cut technology co-existed with the continued use of wood for ordinary housing and the use of brick for both simple and monumental structures.

The study of the Brick Monuments [V.2], indicates that during the early phase of Period II, the rock-cut technology gave way to brick technology because of the fact that rock-cut technology was only useful in the hilly areas thus restricting the scope of distribution of religious
structures. With the advent of brick technology religious monuments could be built on both the hills and plains. The brick monuments included Buddhist stupas, chaityas, vihāras and Brahmānical temples. Bricks, square, rectangular and wedge shaped were used. The technique of plastering with lime mortar was innovated upon during Period II. Brick technology was in use upto Period IV but on a limited scale when compared to Period II probably because of the problems of their maintenance and their short span of life. The study further revealed that the architects of these structures possessed sound knowledge in structural engineering which included the design of walls according to their load bearing capacity and strength of materials and most of these above techniques are found in use even today.

The major results of our study in Stone technology [V.3] reveal that stone as a building material was used on a large scale in raising the sepulchral monuments during the megalithic phase of Period I. This provided a fund of knowledge for its subsequent development in the early historic period. It was used along with brick in many cases. It was only from Period III onwards that stone became the principal building material and was used to build massive structural religious edifices. The development in quarrying technology and the ideology of building permanent structures led the Kings, Queens, Ministers and certain wealthy individuals to undertake the construction of temples and mandapas. The stone technology was continued in Period IV also and stone monuments were built prolifically in the whole of Andhradesa. During this period, a number of experiments in stone technology such as fine methods of quarrying, improving transportation techniques for carrying monolith members, dressing and joinery methods, and skills in putting up scaffolding for construction
were perfected. Inspite of these developments certain drawbacks have been identified in terms of the selection of stone in certain cases which had minimum load bearing capacity, the sand box foundations below certain temples and the irregular joints in the horizontal layers of certain temple walls. However, we observe in our study that the sthapatis were well-trained and taught with traditional science of building various structures right from the selection of site to the erection of temples with proper planning to minimise the expenditure and offer longevity to the structures. All types of stone namely limestone, granite, sand stone, khondalite, shale and basalt were used according to the geological deposits of the various sub-regions. The study also leads us to conclude that the technique of using stone for longevity was best assured in free standing stone built structures and it is proved that most of the structures that have been built in stone are found to be intact whereas the earth, brick and rubble walled structures have partially or totally crumbled. In the recent earthquake that rocked some parts of Maharashtra and raised to the ground all recent housing structures, it was found that only a medieval stone made temple was still standing on the ground. It is clear that stone, of all the materials offered more life and withstood the vagaries of nature for several centuries leaving behind monuments which enshrine the human skills involved in making them.

In this study we had also made effective use of maps and charts to show distribution of different types of buildings/monuments and the various structural elements that went into constructing them. We now highlight below some of these conclusions which take into account developments across various periods and sub-regions of study. This has enabled us to assess
the major technologies related to building materials that were developed across various periods and used on different types of buildings that have been discussed by us in separate chapters above. We have deduced this against the distribution pattern of buildings in their sub-regional context.

A maximum number of habitation buildings were found located in sub-regions A, B and C in Period I. In the subsequent Period II, they were only concentrated in sub-regions A and B. In Period III and IV, was an absence of archaeological evidence on these buildings for all the sub-regions. It is interesting to note that there was no large scale evidence for public utility structures for all periods and sub-regions. There was a solitary evidence of a pathway reported only from sub-region D in Period I. In Period II, there was an increase of such structures which were reported in terms of bathing ghats, roads, rest houses, a stadia and an amphitheatre but all there were known from sub-region B only. In Period III and IV, public utility structures have been reported from sub-region A and C in the form of mathās and a customs house, respectively. Irrigation structures have been reported from sub-region A in Period I, and Period II. Only a few of them few have been located in other sub-regions. In Period III sub-region D saw a maximum number of irrigation structures whereas in Period IV a few of them were found located in sub-region A, with a maximum number of such structures noticed in sub-region B.

We did not have evidence of defence building during Period I in any sub-region because this period characterized as a pre-state society. In the subsequent period, i.e. Period II, defence buildings were distributed
equally in sub-regions A, B and C whereas only a solitary example came from sub-region D. During Period III, sub-regions B and D were distributed with few defence buildings in contrast to their prolific occurrence in the other two sub-regions. These buildings were equally distributed in sub-regions A, B and C in Period IV. Their number however, was less in sub-region D for this period.

The evidence for funerary structures was available to us only for Period I. All types of funerary structures, i.e., pit burials, stone circles, rock-cut, cist burials, dolemns, menhirs, avenues and alignments were found located only in sub-region A. Rock-cut burials, avenues and alignments have been absent in sub-region B, whereas in sub-region C only three types of burials namely, pit burials, stone circles and rock-cut burials have been reported. In sub-region D, pit burials, stone circles, cist burials and dolmens were found located. Rock-cut burials were found located in sub-regions A and C only.

The first and foremost monumental structures discussed by us were the rock-cut monuments which were built in Āndhradeśa from Period II onwards. These monuments were excavated in the form of chaitvas. stupas and viharas prolifically in sub-region C and the best example of this was known from sub-region B. During Period III rock-cut monuments were mainly in the form of Brahmanical temples distributed in sub-regions A, B and C. No rock-cut monument has been reported from sub-region D for all the periods.

Brick monuments were built prolifically in Period II on the plains and hills in sub-regions C and B whereas their number was less in sub-regions A and D. In Period III they have been are found in the form of Brahmanical
temples in sub-regions A and B only. In Period IV these monuments were absent in sub-region A and D in while a few of them have been found in sub-regions B and C.

Stone monuments were built in the form of Buddhist and Brahmanical structures from Period II onwards found distributed in sub-regions A, B and C. In Period III these monuments were found in sub-region also. In Period IV, there was a culmination in the building of stone monuments and they were found in almost all the sub-regions.

The above distribution of different types of monuments in sub-regions can, in some cases, be suggested on the basis of the availability of raw material used to build them. For example, in Period I, it has been observed that funerary structures, i.e., pit and stone circles were found located in all most all sub-regions, whereas rock-cut burials were found only in sub-region A in the proximity of rocky areas. In the sub-region C because of its sandy, loamy and clay soils funerary monuments such as dolmens, menhirs and avenues were not found as the geology of the area made it impossible to have raw materials for such large structures. Similarly, in Period II, rock-cut monuments have been found located in the regions where natural rock deposits were available.

In Period III it has been observed by us though brick monuments were found in almost all sub-regions, it was only in sub-regions A and B that stone was also used along with brick. During this period due to the concentration of resources in the hands of local elites they also invested in strengthening brick monuments. Thus, stone extracted from the nearby
quarries was used in those sub-regions where it was locally available. For example, stone monuments have been found **prolifically** distributed in southern parts of sub-region A, south-western part of sub-region B, northern part of sub-region D as sandstone quarries were found located in these sub-regions. In sub-region C stone monuments were located only in northern part because of the availability of sandstone in that area. In Period IV several of stone quarries became known in almost all the sub-regions. The only use of brick in stone temples of this period was for the **śikharas** of the temples. Stone was also rampantly used for irrigation structures for lining the inner sides of tank bunds and for sluices and canals in a few cases.

In many other cases different varieties of stone were used in the same sub-region. For instance, it has been noticed that in Period II. Kondalite stone was used for religious buildings in sub-region C only. However, limestone was used to decorate the Buddhist structures in all sub-regions, though it was not a local material and had to be transported to distant places from sub-region B. On the other hand, it was noticed that granite stone was preferred for Buddhist monuments in sub-region B particularly for railing and flooring. In Period III, it was noticed that granite and sandstone became common materials for building Brahmanical temples in sub-regions A, B and D since they were available in large quantities. Shale stone was however, used in the southern part of sub-regions A, B and C and the norther part of sub-region D as these areas were rich in its deposits.

The most common building material used over all Periods and for different types of buildings in all sub-regions was mud. It has been

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observed that mud was invariably used for habitation buildings and irrigation structures in Period I and Period II. It was used in particular for raising walls and laying floors. In the case of monumental buildings it was used to fill the core of the Buddhist structures. Its most continuous use was as a binding material in brick structures. This was later replaced by the use of lime. In Period III for instance, mud and lime came to be used together as binding materials for all kinds of buildings like habitations, public utility, defence and religious ones. In Period IV, only lime mortar was used for construction of all types of structures as it was now realized that it offered the greatest durability as a binding material. Brick was another building material prolifically used for all types of habitation, public utility, defence and religious structures in Periods II, III and IV with the exception of defence buildings during Period IV. Though stone was used right from Period I onwards as in the case of its use for funerary structures, its use was more prolific in the case of temples and defence structures during the Periods III and IV. In some cases it was found suitable to raise habitation, public utility, defence, and religious structures in all the periods.

The change in the use of building material from one media to the other it has been observed by us meant that technological innovations were often being made. For example, frequent repairs of mud floors led to the use of lime for flooring. This was further perfected in lime concrete which the people found more durable and it provided longevity for the structure. The earlier mud stupas began to be encased with brick and stone to keep the structure intact so that it could withstand the vagaries of time. Similarly, the earlier use of thatched roofs which were prone to leaking
during the rainy season had to be innovated upon and leak proof. Therefore, roofing material such as tile were discovered. Tiles began to be used to cover the roofs of habitation and religious building from Period II to IV. The case of perfecting floorings was similar and the earlier use of mud and lime for floors was innovated upon to make better floorings by paving them with brick and stone. Not all materials were found in a natural state. A knowledge of combining several raw material was also needed. This was particularly needed for making bricks. A proper mixing of mud with various ingredients had to be perfected. In some areas the mud was gritty, hence fine bricks could not be made. Therefore, the technology of brick making gradually evolved. Similarly, rock-cut technology was preferred in the areas where soft rock was available. However, cutting of stone was ultimately mastered in almost all varieties and used according to its availability.

The study also revealed that there was a co-existence of various technologies applied to building different types of structures across various periods. Though the earlier techniques were simple, they survived for a long time as they were techniques and new innovations were made in them from time to time. For example, though brick had been invented mud walls continued to be used and even today they are used because they provide a cool environment for living purposes in a hot climate. Similarly, even though the technology to make large irrigation structures was known in society small irrigation structures in the form of reservoirs and dams built exclusively using simpler and more feasible techniques were preferred. Hence, even today the small check dams are still in operation at various places. Some of these time tested techniques have survived not only because they were found useful by society but also because they defied
centralization. In other words, local communities were able to decide on the use and execution of these simple technologies. Scholars tend to suggest that this implies no change in society and technology. On the contrary, we would like to emphasize that there was a co-existence of simple and sophisticated technologies. Infact, there was an increase in the knowledge of making sophisticated tools over a span of time and this resulted in offering better plans and building materials which furthered the existing fund of knowledge in building technology. This was clearly apparent in terms of the multiplicity of skills known to the people of early Andhradesa. The technology at the end disposal of the common people who used it for their every day living co-existed with sophisticated technology used to make monumental buildings which were built by elites and wealthy people.

In our last chapter of study we discussed the relationship of men involved in building various structures and their skills in terms of their organization, patronage and training. Though they were organized into guilds or craft organizations their talents and they were allowed to be creative. Contrary to existing generalizations inscriptional data showed that individual talents were recognized and they were given suitable positions in the royal service. Most buildings right from early historical times to medieval times did not contain the names of the architects or engineers who built them. In our case study of Andhradesa we have a few instances of the names of the architects who were credited with the sthapatis job they did. Thus for instance, we are told that Bhiravakonda rock-cut caves in sub-region B of our study were excavated by two šildins, namely, Kuruvadi Acharlu and Velugunta Acharlu in a label inscription found
engraved on the walls of these caves. It was further noted by us that these specialized social groups were supported by society as a whole and received donations in the form land grants from different sections in society. They were usually trained in the family skills over generations and therefore, there was a concentration of this knowledge in the hands of a relatively few professional experts. Thus the evolution of building technology had a lot to do with how this knowledge was conserved and transmitted orally and practically over generations. Infact, it can be suggested that the fund of knowledge that accrued from generation to generation enabled the technology to remain dynamic. Most of the buildings described by us had a functional and practical efficacy which gradually evolved over time. However, it must be concluded that though the silpins and sthapatis were technologists, they were also given training in art and aesthetics which had strong roots in a metaphisical value system that enabled them to have a stable perspective in which to develop their skills.

Thus it can be concluded that our study basically looked at the collective contributions made to the evolution of building, technology of India's past. The particular case study of Andhradesa highlighted this at a micro level. We have argued that though this can be described from the available written traditions, the built-in spaces that have survived in the archaeological record offer far more specific information on the subject. This interestingly highlights the continuity of certain technical skills while underlining that changes also took place. The rich written sources can only be used to corroborate the building technology of monumental structures. An important contribution of our study was to identify those aspects of simple technology used in the construction of ordinary structures which form a valuable part of our collective technological
knowledge that is hardly written down in texts. This could only be gone into by not neglecting the partial and fragmentary pieces of archaeological information especially those that were found in the proto- and early-historic context. In this regard our study has revealed that medieval archaeology not only within Andhradesa, but in India as a whole has neglected undertaking work on site excavations other than those where major temples are located. We were further able to move away from understanding aspects of building technology only in terms of the contributions made by political and religious elites as we did not argue within a pattern of narration confined by dynastic or sectarian history. Though some of the buildings do reflect religious creeds, they more emphatically and explicitly reflect skills that went into making them, and in turn, are clothed with the contemporary social ethos and environ in which they stood.

Indian material evidence is used, often in fragments, to explain orderly achievements of an ancient civilization. We would like to submit that our attempt at a descriptive and historical account of the evolution of building technology cannot be explained by being excerpted out of the total context. Infact, we hope that this study will enable future scholars to more fully reconstruct and understand this context whose significance at present is often marred by us merely treating its manifestations as archaeological and historical sources of information.