A NEW CITY HALL FOR SAN SALVADOR
B.A. Architecture - 1933

Ernesto de Sola
Dean William Emerson  
Chairman of Thesis Committee  
School of Architecture  
Mass. Inst. of Technology  

Dear Sir:

I submit herewith, in partial fulfillment of the requirements for the degree of Bachelor in Architecture, a thesis entitled **A NEW CITY HALL FOR SAN SALVADOR**.

I take advantage of this opportunity to express, to you and the members of the Faculty, my sincere appreciation for the advice and criticism throughout my five years at the Institute, factors which have more than helped to make this thesis possible.

Respectfully,

Ernesto de Sola
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View of the "Plaza Dueñas", facing one side of which the city hall of this Thesis would presumably be built.

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REPORT ON A PROPOSED CITY HALL FOR SAN SALVADOR

CHAPTER I
On general considerations.

CHAPTER II
On construction and the way the building is designed to withstand earthquakes.

CHAPTER III
On the question of Design and the limitations imposed on it by climatic conditions.

Ernesto de Sola
INTRODUCTION

Choice of subject

When the first preliminary announcement was posted by the Thesis Committee, I had in mind three subjects from which I intended making a choice. All were buildings for my native city of San Salvador:

a) A National Museum for the permanent exhibition of Maya art.

b) A National Shrine commemorating the independence of the Republic.

c) A City Hall.

Of these I early discarded the first two as being a bit idealistic and made the choice of the City Hall. Through this choice I have come face to face with many of the practical problems that confront an architect in the exercise of his profession. Here, for example, were the problems of placing the structure on a definite measured site; of finding a medium for the satisfaction of both climatic demands and the principles of design; of limiting the design for the sake of economy.
yet producing adequate architecture; of taking cognizance of the style and nature of neighboring buildings; etc. In short, the subject of a City Hall presented a more interesting program than would have the Museum or the National Shrine.

To this may be added the incentive that San Salvador has at present no city hall; the old one having burned down over ten years ago. The empty lot on which the old building stood is being kept ready for the erection of a new one, if not soon, at least in the near future, and such a possibility has not failed to lend an air of actuality which has doubled the pleasure of this work.
CHAPTER I

HISTORICAL SKETCH: - Inspiration

To find the first Town Hall in Central America I went back to the year 1526 when the lieutenants of Cortez's army were busily engaged in building towns and cities on the sites of the conquered Maya kingdoms of Guatemala. The first buildings were churches and "Cabildos" or municipal headquarters and many small settlements grew up around central squares or Plazas on which these buildings were located.

Central Plaza in the city of Antigua, Guatemala, (now a "dead city"): showing the Cathedral al left and City Hall at right.
The style of the warmer climes of the mother country, Spain (often called Spanish Colonial) became dominant from the start, although here and there can be found a few Maya details in buildings which were obviously results of the employment of Maya Indian craftsmen. But these occasional signs of life of the Mayan style were very rare and never even so far as modified the original conceptions of the settlers. What did modify them were the limitations of material, climate and labor and today, if there is such a thing as an architectural style peculiar to Central America, it certainly cannot be other than a modified form of the Spanish Colonial Style.

Due to devastating and frequent earthquakes few buildings of the colonial days exist today, but fortunately the few that do are almost intact, save for a periodical falling and replacing of plaster.

Of the Municipal buildings still standing the most noteworthy are the "Ayuntamiento" and the "Palacio de los Capitanes Generales" in the colonial city of Antigua, Guatemala, now almost a "dead town" and happy hunting ground for
tourists. As shown below, the "Ayuntamiento" is a simple structure, consisting in elevation of a double arcade; in plan this building has little or no design, taking its own course, we may say, around a central court or "patio". The crudeness is readily excused since it was built in the early 16th century.

(The "Ayuntamiento"; built in 1520.)

The "Palacio de los Capitanes Generales", of later date and more elaborate, became the "city hall" (if such it may be called) of the city of Antigua, a function which it fulfills to this day. It is interesting to note again the covered or arcaded sidewalk. Good sense was used in sheltering the sidewalk wherever
façades flanked open squares or plazas, a step which was not absolutely necessary on the narrow streets where the buildings of one side cast a shadow on the other.

("Palacio de los Capitanes-Generales"-1526)

As most city halls were located on open plazas, the continuous use of arcades on these buildings gradually came to be associated with them, and today the Central American layman finds it hard to think of a city hall, ("Cárcido") without its covered sidewalk.

Since there is such a wealth of local character, if not of architecture, in the Colonial buildings like the "Ayuntamiento" and "Palacio de los Capitanes-Generales" illustrated above, I have gone back to these for inspiration; I
have kept the arcaded sidewalk; the inner "patio" etc., subject of course to limitations that a new material and other factors have imposed on the design.

CHOICE OF STYLE

For the City Hall of San Salvador I chose a modified form of the Spanish Colonial as the most appropriate style after considerations which I have briefly outlined in the preceding pages. Although the NATIONAL architecture of the Republic has, not without some pretentiousness, sought to emulate the architecture of Paris, MUNICIPAL architecture has remained true to the old Spanish traditions and any style other than that of the Spanish Settlers would be foreign in character to San-Salvador's municipal life, it seems to me. In spite of outside influences, the life of the city still pulsates around the central plazas; here one feels the heart of the community; here in the evenings the military bands give concerts and the citizens march around in slow tempo among the palm trees; here carnivals take place; and quite a few revolutionary movements have had their origin
in these open squares. In other words, the Plazas of modern San-Salvador are the plazas of the Spanish "conquistadores" with modifications and it would have been folly to have surrounded them with architecture that was not expressive of the Spanish customs in which tradition and a romantic love for the past play important roles.

As the Plaza Dueñas (on one side of which the City Hall would presumably be built), is already surrounded by arcaded buildings of the type shown below; the addition of the City Hall with its own arcade would complete the "arcaded" square, save for a church which faces the remaining side and which, being old, would have to be rebuilt soon.

One side of the "Plaza Duenas" in modern San Salvador, showing covered sidewalk.
Style chosen vs. Concrete

In working out this thesis I was aware that the attitude to be followed in the conflict between construction and style presented a delicate problem. The material used for the construction of the City Hall, being reinforced concrete, was not harmonious with the Spanish Colonial Style. But there was no choice; the use of concrete was dictated, (as noted in the preliminary program handed to the Committee in March), by the fact that in Salvador it has proved the most reliable type of construction for resisting earthquakes. Steel is good and so is stone-facing tied back to a concrete core, but in tropical climates they do not quite equal reinforced concrete proper.

The problem resolved itself, then, into so modifying the details and lines of the style as to make it more consonant with the material, yet keeping the desired feeling and character. That is, I thinned the walls to the required thickness of concrete; discarded much of the ornamentation and lengthened the spans of beams and girders to concrete size.
However, too much modification for the purpose of expressing the material was not advisable, for although Salvadoreans admit that concrete is the only earthquake-resisting construction, they wish it were not so; they wish that climatic conditions would allow building in stone, and perhaps because of this, gratification has been sought heretofore in the expression of stone by all architects.

Therefore, although I have tried to express concrete as much as possible, I felt that in this case there was enough excuse for the concealment of the material at certain points behind some architectural screen, as for example around windows, which could be veneered with stone. Besides, it would have been poor compliment to Salvadorean taste to have entirely deprived it (out of what seems a misplaced desire for sincerity), of one of its architectural consolations, namely: that Salvador can have stone buildings in appearance, if not in fact.
CHAPTER II

THE QUESTION OF EARTHQUAKES AND EARTHQUAKE-PROOFING:

The research done for this thesis brought me principally into the question of earthquake-proofing. San Salvador is located in a plateau at the foot of a volcano.

Panoramic view of the city of San Salvador, located at the foot of a volcano.

There have been so many strong earthquakes since the foundation of the city that the plateau is called "Valle de las hamacas" or Valley of the hammocks and many a verse has been written about the way the city has swung from side to side, to and fro; up and down, in the past century.
Earthquake-proofing then is of great importance and I sought information on the matter from several well-known textbooks and by writing letters to authorities on the subject in order to clear up dubious points. Among the letters written I may mention the following two which brought the most useful answers:

1. To Frank Lloyd Wright (builder of Tokio's earthquake-proof Imperial Hotel); on the question of foundations and the advisability of the use of steel girders and posts as opposed to reinforced concrete proper.

2. To Professor Lydik Jacobsen (originator of the shaking-table earthquake experiments at Stanford University, California); on the effect of arches and circular forms on earthquake-proof buildings.

These two men have long been investigating earthquakes and their answers helped to form pillars on which I could lay justification for several conclusions expressed in the design of the City Hall.
With this and other reliable information at hand, I was able to follow the matter of construction along a definite course. Starting from the bottom up, I reasoned as follows:

**Foundations:**

Last year, while attending a course in Building Construction at M. I. T., I had the opportunity of hearing Professor Kyoji Suyehiro of the Institute of Earthquake Research, Tokyo, speak on the subject of earthquakes. Professor Suyehiro had made a rather ingenious experiment to determine whether the motion of the earth's crust during earthquakes was purely horizontal or not. He had buried (1 ft. or so under the ground) a tin with coins in it. After an earthquake of great intensity the tin was not only found half-out of the ground, but the coins were scattered on the surface. This, observed Professor Suyehiro, helped to show that the movement of the earth-crust during earthquakes is much like the movement of the ocean.

Today, there is a definite school of researchers who are convinced that this is so and since nothing has been proved to the contrary,
it is safe to assume that earth motion is in the form of rapid waves. This being the case, it is advisable not to build foundations of buildings to great depth, but to make them flat so that the motion of the earth will "take the building with it," as shown in diagram below.

It is especially necessary in buildings that rest on semi-hard land, part of which is clay, as is the case in the City Hall of this thesis.

To better illustrate the advantage of shallow foundations, we need only compare the slow even movement of a flat log on the ocean with that of a buoy. The former has little of its
volume under water and moves on the crest of the wave; the latter, having more immersed volume, bends from side to side as a wave passes.

With these considerations in mind I have designed my City Hall with no basement (save for a small semi-sunk area under the auditorium). This area, however, is not very deep and would not disturb the movement of the building noticeably during an earthquake. Since there is apt to be adjustment in the earth-crust that supports the building as a result of violent tremors, I would suggest building the foundations in a way which has proved successful in Mexico, i.e., by laying a layer of loose and dry rock, cement blocks and such directly below the concrete foundation slab; this layer of rock would be properly stamped and would act as a sort of cushion to absorb part of the shock of the earthquake; if the earth were to sink slightly at any given area, the loose rock would tend to fill the depressions and prevent the cracking of the concrete slab. Under columns and walls there would be strong spread footings to take care of the extra weight at those points.

Walls:

I have designed the building with as low a
center of gravity as was possible, by decreasing the thickness of walls and columns proportionally to the distance that these are from the ground. Thus, (to take a definite part of the building for example), in the central motive including lobbies and tower, the thickness of the columns decreases from 3 ft. at the ground floor to 7 inches at the uppermost part of the tower.

Mr. Frank Lloyd Wright attributes much of the success of his earthquake-proofing at Tokio to his having kept the center of gravity exceptionally low, and although this precaution is only secondary to the principle of a rigid frame, it deserves attention.

Columns and Girders:

For a long time earthquake engineers have debated rigidity vs. flexibility in buildings. In the light of the more recent discoveries of earth-motion I am inclined to favor rigidity. It is true that a "flexible" building would be almost free from the danger of total collapse, but what would remain of it after continuous shaking would be merely the core. A rigid building, on the other hand, would "keep together" more properly it seems to me. Therefore, in design I have kept in mind
the thicknesses of floor slabs and columns at certain points where such members would need diagonal bracing. Bracing may be carried even to an exaggerated degree, since it is conducive to rigidity. The floor-slabs need not be unnecess-arily thick provided the spans between girders are not too great.

Openings:

A letter from Professor Jacobsen of Stanford University (already mentioned in this report) assured me that arches would not weaken the earthquake-resistance of a concrete building, providing they were generously reinforced. With this letter in hand, I did not hesitate to use a continuous arcade in the facade and in the courts, as had been my intention from the start. Not only was the freedom to use arcades welcome from a point of view of design, but I came to learn that arcades may be even stronger than post-and-lintel since the concrete mass between the arches may be designed to act as diagonal bracing.

Other openings are rectangular with extra reinforcing as customary.

The Roof:

In the study of the roof I aimed at the solu-
tation, among others, of two major problems: a) keeping it light and rigid; b) designing for the shedding of rain-water in an appropriate way.

a). A concrete slab, acting as a floor was found to be most advantageous from the point of view of earthquake-proofing and endurance of material. I gave consideration to tile, corrugated iron, corrugated asbestos, slate; but discarded all for various reasons, most important of which were statistics compiled from several earthquakes which showed that a great percentage of deaths occur from the falling or sliding of tile and slate. Corrugated iron, while not falling into this group of "killers", does not give very good results in the tropics as the expansion and contraction due to the changes of temperature from day to night cause defects.

b). One of the many limitations imposed by construction on the design of the City Hall was in the placing of the leaders which drain the water from the roof. These have to be exterior so that they may not harm the walls during earthquakes and so that they may be
repaired easily. As the placing of such leaders on the facade of the building would have greatly marred the beauty and effect of it, I inclined my roof inwards, so that all the water would be run into gutters at the top of the court elevations, from where the leaders would carry it into underground pipes. The pitch of the roof I made very slight as in the tropics it rains heavily and a steep roof would cause the overflow of the gutters.
DESIGN.

Throughout, design was greatly controlled by local climatic conditions; the aim of producing an earthquake-resisting building was often found to be irreconcilable with and more important than many of the principles of design. Decisions were made more puzzling still by the fact that the scale required by tropical weather seemed to be in conflict with factors that would in certain cases make ideal earthquake-proofing conditions.

In general the building consists of a mass surrounding a large inner court which is divided in halves by an auditorium. Going more into detail, the plan may best be described as follows:

Covered sidewalk:-

In order to express direction I kept the front arcade of the same height throughout, with no breaks except at the center to emphasize the entrance of the building. This solution fell in line with considerations of the rigidity of the
building which called for a continuous out-to-out-floor-slab on the second floor.

Ground Floor:-

The rooms relegated to this floor were those which would be more in use by the bulk of the populace and therefore meant to be within easy reach. On entering the building by the front, the citizen goes into a square hall from where he may choose direction along a circulation which consists of a continuous arcade flanking the courts or "patios". Entrances or exits on the side-streets were provided at two end-points of this arcade. Next to these entrances (so that they may be used independently) I located the Municipal Police, on one street and a small public reading room on the other. Salvador's municipality includes a corps of 15 special policemen whose duty it is to see that city regulations of sanitation, drainage, etc. are carried out; this corps operates independently of the city police and takes no prisoners; instead it imposes fines. There is need for no more than a large hall with ante-room for these men who are constantly sent on errands. Annexed is the office of their chief.
As regards the location of the public reading room off the side entrance of the parallel street, it was the only convenient place to locate such a room since it may be used in the evening when the rest of the building is closed. Although not falling into the regular list of rooms required of Salvadorean municipalities, this reading room was specially desired by the city of San Salvador since there is no public library outside that of the University to satisfy that small part of the populace which is intellectually inquisitive. Only a limited number of books, some periodicals, pamphlets and such would be shelved here.

The Auditorium:

San Salvador has long needed a small auditorium where an occasional distinguished visitor may speak as guest of the city, and it is the desire of the community to incorporate such a room in the City Hall. As such an auditorium would be used mostly at night when there would be no cross-circulation through the entrance hall and as the semi-formal character of this gathering place called for a central location, it was placed directly in line with and leading off the main en- 
trance of the City Hall, although at a higher level so as to allow for a small basement floor under it.

Basement under Auditorium:

Although for constructional purposes it was not advisable to build a continuous basement under the building, (as explained under the chapter on earthquake-proofing), there was need for a semi-sunk area where the conveniences for a certain group of employees could be located. I should here point out that there exists in Salvador, as in most of Latin America, a race condition similar to that of the Southern States of this country. Whilst Salvador has no negroes, the lower classes or so-called "indios" who supply menial labor, are generally considered to maintain different standards and habits. Not only must their wash-rooms be separated from those of the other employees, but they must be hidden as much as possible from public view; therefore it was necessary to put them in the basement with an entrance in the back, away from the courts.

To make foundations shallow and to provide abundant air circulation, the basement was only designed half under ground level with windows on
"Earthquake-escapes":

Besides the main stairs that lead off the entrance hall, I have placed four stair-towers on the courts within easy reach of people on the second floor. These stairs would be used in a normal way, but their chief value would come during earthquakes when the general feeling is to run down to the ground level as quickly as possible. True, the rest of the building is earthquake-resistant in itself, but there exists during earth tremors an indescribable panicky feeling which would find a measure of reassurance in corner massive stair-towers that were not seemingly part of the main structure. Besides, these corner stairs would be within easier reach of more people than would stairs in another location.

The Second Floor:

City government in Salvador consists of a council of aldermen presided over by the Mayor, ("El Alcalde") and vice-Mayor, ("El Oficial Mayor"). Since this council really constitutes the government, the council room was located in the center front of the second floor (the most important loca-
tion) with two formal entrances opposite the main stairway. The room is flanked on each side by a supplementary room which would serve as a caucus room. The council room itself was made as large as possible under the circumstances; (the depth of the given lot for the city hall was limited and construction requirements dictated a hall span on the second floor equal to that of the first.)

As the Council would not meet except every so often, the council room may be used for example as a reception room when an occasional distinguished visitor is "given the key to the city". Such a visitor may appear at the balcony of this room before the populace.

The next most important rooms; those of the Mayor and vice-Mayor were placed at the corners of the circulation. Rooms for other council members were located in the front of the building; two councilors in each room, as these men only come to their offices occasionally when there is business to be done.

Third floor "Exhibition Room":

The third floor, directly below the tower is composed of a small exhibition room where relics of pottery of the Maya Indians and the like may
be exhibited. Constantly bits of such relics are being dug up in different parts of the country and there is no place where they may be exhibited in groups. As a sort of small "museum", the third floor of the City Hall, then, would find many visitors among tourists and people from other cities of the Republic.

Other Rooms:

No special explanation is needed for the other rooms of the City Hall, except perhaps the wash rooms which were located at inconspicuous points. There are two sets of ladies' rooms; one in the small basement, off the main entrance and another at the far corners of the second floor. Besides, there are two separate toilet rooms in the auditorium.

THE ELEVATION

The elevation is mainly a result of the plan. At first I did not intend having a tower, but after consideration I decided that it was needed in order to create a structure that would dominate the other arcaded buildings of the square in elevation. This of course made the center of the ground floor heavier in "poche" that it would have been otherwise.
CONSIDERATIONS FOR THE FUTURE:

There has been talk from time immemorial of appropriating the whole block of which the city now owns half, so that it may all be covered with the City Hall. However, due to the fact that property is owned on this block by some of the most influential families in the Republic, such appropriation is more in the realm of thought than of fact.

Nevertheless, were the City at any future date to acquire the whole block, the City Hall of this thesis may be enlarged, without much modification, as illustrated in diagram below, resulting in a square with a Greek-cross in the center.

But a Municipal building as large as that would satisfy a population double that of the city today, (150,000), and for this reason I have left unused a section of the actual city lot for which there may be more urgent demand by some other public building.
**APPENDIX**

List of questions sent to San Salvador for information during the work on the Thesis.

Q.1.- What are the dimensions of the lot in meters?
   A.1.- 85.30 x 43.00

Q.2.- Does the back of the lot join an existing structure, and if so is there any possibility of the Municipality obtaining the whole block in the future?
   A.2.- Lot joins properties of Concha v. de Regalado and Ana v. de Aguilar. Municipality shows apathy about obtaining the whole block.

Q.3.- What is the level of the land above street level?
   A.3.- 0.30 meters.

Q.4.- What is the nature of the earth: whether sandy clay, soft clay, hard-pan, etc?
   A.4.- Partly soft clay; partly compact clay and sand.

Q.5.- What are the dimensions of the Plaza Dueñas, including the sidewalk?
   A.5.- 101 sq. meters.
Q.6. - What is the average height for office-rooms in San Salvador?

A.6. - From 5 to 6 meters.

Q.7. - Is a small auditorium or lecture hall required?

A.7. - Yes.

Q.8. - What are the approximate heights of buildings surrounding the square?

A.8. - 12 to 14 meters.

Q.9. - What are the maximum and minimum temperatures in San Salvador?

       Min. - 22° "

Q.10. - Could you obtain a picture of the old City Hall?

A.10. - None obtainable.

Q.11. - Toward what direction would the building face?

A.11. - North.