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A CONVENTION AND TOURIST HOTEL IN TAIPEI, TAIWAN REPUBLIC OF CHINA

by

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A. INTRODUCTION

1. History

More leisure, more mobility, more prosperity and more people are the major factors which have led to the worldwide boom in hotel construction over the past decade. The full extent of this growth is not known, but its origins are closely related to the growth of air travel and the consequent arrival, in many places, of numbers of tourists who increased the pressure on hotels which were already crowded and outdated. The emergence of new nations in Africa and Asia has also fostered a host of hotel projects in places where comfortable accomodation was formerly almost non-existent. Taiwan - The Republic of China - can be considered a case in point.

Because of renewed world-wide interest in the Far East - Japanese World's Fair and Winter Olympics, the emergence of Red China as a world power, American involvement in Indo-China, the development of new world markets and trade-centers - Taiwan is on the brink of an explosive growth of tourist activity with which it is difficult for new hotel construction to keep pace.

2. The Client

According to the China News, tourism circles in Taiwan predict that during 1973, 631,000 foreigners and overseas Chinese will have visited the island.

To promote tourism, The Government of the Republic of China in 1965 established the Taiwan Tourism Council and the Taiwan Visitors Association. In 1966 the former was replaced by the Taiwan Tourism Bureau under The Provincial Department of Communication; the latter is a private organization which provides public relations support. With co-ordinated efforts of government and private agencies, much progress has been made in the simplification of entry and exit procedures, construction of new hotels, improvement of transportation facilities, and expansion of promotion resorts. As a result, Taiwan is rapidly becoming a major tourist attraction in the Far East.

The number of visitors to the island rose from 14,974 in 1956 to 312,000 in 1969. On the basis of the pattern of growth of tourism in Hong Kong and Japan and discounting for Hong Kong and Tokyo being on the round-the-world air route, it is forecasted that the growth of tourism in Taiwan will, by 1974, bring the number of visitors up to the 3/4 million mark and by 1976 the million mark.

Before continuing this discussion it is felt that a very brief history of Taipei, capital of Taiwan and site of the proposed hotel, would be of interest and perhaps beneficial to the reader.

Historically, Chinese settlement in Taiwan dates to the twelfth century, it was not until the seventeenth century, however, that large groups of Chinese began to cross the Taiwan Straits. From 1624 to 1661 European settlement began with the Dutch establishing and holding a trading base on Taiwan. After the overthrow of the Ming dynasty by the Manchus, Chang-Cheng-Kung, a Ming loyalist, invaded Taiwan in

1661 in the hope of using the island as a base for mainland recovery. Within a year the Dutch were forced to surrender their holdings at Fort Zeelandia near present day Tainan, and soon tens-of-thousands of Ming followers began moving to the island concentrating themselves in Taipei and Tainan, the largest city in southern Taiwan at the time. Manchu rule was not established until 1683. (See page 9, 10)

Following the first Sino-Japanese War in 1895, Taiwan was ceded to Japan and was not returned to China until the end of world War II in 1945. In those 50 years Taipei became the capital of Taiwan. Taipei, since December 1949, when the Chinese Communists overran the mainland, has also served as the temporary seat for the Republic of China to carry on the struggle for Chinese freedom.

In recent years Taipei has taken on a cosmopolitan hue as a result of the bulging influx of foreign tourists and visitors. The city, with its azalea-adorned roads, red-colored taxis, Italian-made scooters, "always-at-your-service" hotels, clubs and American-style bars and cafes, became Taiwan's first special city on mid-1967 and now is directly under control of the Executive Yuan (cabinet). Hill-ringed Taipei is now a highly industrialized, commercial, communication, educational and cultural center for the people of the Republic of China.

With the planning of the proposed hotel for Taipei being completed in 1973 and the number of visitors forecasted for that year at 631,000, the hotel accommodation requirement to cope with the growth of tourism should be as follows:

@ 60%	Occupancy	- 6,502 rooms
70%	"	- 5,573 "
80%	"	- 4,877 "
90%	"	- 4,334 "
100%	"	- 3,901 "

There are at present 3,253 rooms in Taipei in hotels classified by the Taiwan Tourism Bureau as International Tourist and Tourist Hotels. The total number of hotel rooms in 1972, including the proposed 250 room hotel, plus three new hotels of 300 rooms each, will be 3,803. This means that on the basis of even distribution to all the hotels in Taipei, there will still be a shortage of 98 rooms at 100% occupancy.

The purpose of this project, therefore, is to collate all the information collected in connection with the proposal to build a new modern hotel in Taipei and to meet the high standard of accommodation and facilities demanded by the International Traveller.

These facilities will enable the hotel management to promote tourist activities for the encouragement of visitors to prolong their visit, recommend trips to others, and to return again. The provision of mere sleeping and eating accommodations is inadequate in today's competitive world of tourism.

TOURISM 1956 - 1972

Year	No. of Visitors	Percentage Increase	Foreign Exchange Earnings
1956	14,974	100	$ 936,000
1957	18,159	121	1,135,000
1958	16,709	112	1,044,000
1959	19,328	129	1,208,000
1960	23,636	158	1,477,000
1961	42,205	282	2,638,000
1962	52,304	349	3,209,000
1963	72,024	481	7,202,000
1964	95,481	638	10,312,000
1965	135,666	892.7	14,703,000
1966	182,948	1,221.8	20,124,280
1967	253,248	1,691.2	27,857,280
1968	301,770	2,082.0	53,271,450
1969	365,820	2,439.0	64,384,600
1970	438,000	2,930	74,460,000
1971	526,000	3,520	89,420,000
1972	631,000	4,220	107,270,000

Note: Hotel classification by the Taiwan Tourism Bureau
Year of 1968

COMPARISON OF TOURISTS GEOGRAPHICALLY

Country	1965 No. of Visitors	1965 Percentage	1964 No. of Visitors	1964 Percentage
U. S. A.	47,843	35.79	38,744	40.58
JAPAN	38,499	28.80	21,519	22.54
PHILIPPINES	6,231	4.66	5,161	5.41
MALAYSIA	4,465	3.34	2,592	2.71
AUSTRALLA	3,503	2.62	1,849	1.94
ENGLAND	3,252	2.43	2,619	2.74
THAILAND	2,842	2.13	2,195	2.30
OKINAWA	1,925	1.44	1,214	1.27
KOREA	1,571	1.18	1,066	1.12
W. GERMANY	1,563	1.17	1,089	1.14
CANADA	1,369	1.02	1,010	1.06
OVERSEA CHINESE	15,206	11.38	12,464	13.05
OTHER	5,397	4.04	3,949	4.14
TOTAL	135,666	100.00	95,481	100.00

Note: Hotel classification by the Taiwan Tourism Bureau
Year of 1968

SURVEY OF HOTEL ACCOMMODATION

Name of Hotel	No. of Rooms	Room Rates Single	Room Rates Double
*President	300	$ 9.00 - $10.00	$12.50 - $14.00
*Mandarin	330	10.00	15.00 - 22.50
*Ambassador	273	9.00	11.00
#First	200	6.00	10.00
*Grand	156	9.00 - 12.00	12.50 - 15.00
#Orient	120	5.00 - 7.00	7.00
#Taiwan	86	5.00 - 7.00	8.00 - 10.00
#Pacific	65	4.00	4.00 - 8.50
#China	56	4.00 - 7.50	11.00
#New Taipei	54	8.50	10.00
#Oasis	50	5.00 - 6.00	7.00 - 8.00
#Prince	50	6.00 - 7.00	7.00 - 9.00
#Sun	50	5.00	7.00 - 9.00
#Papace	45	5.00	6.00
#Aster	40	6.00 - 7.00	9.00 - 10.00
#Paric	40	4.00	5.00 - 6.00
#Stone House	37	4.50 - 5.50	6.50 - 7.50
#Washington	35	5.50	6.50 - 7.50
Other	1,127		
Total	3,253		

Note: Hotel classification by the Taiwan Tourism Bureau

International Tourist Hotels - marked *

Tourist Hotels - marked #

Year of 1968

HOTEL ACCOMMODATION REQUIREMENT - FORECAST FOR TAIPEI

Year	Forecasted Number of Visitors	No. of Rooms Required at Occupancies of % Range				
		60%	70%	80%	90%	100%
1970	375,000	5,479	4,696	4,110	3,652	3,288
1971	445,000	6,502	5,573	4,877	4,334	3,801
1972	520,000	7,598	6,512	5,699	5,065	4,559
1973	615,000	8,986	7,702	6,740	5,990	5,392
1974	730,000	10,667	9,142	8,000	7,111	64,000
1975	865,000	12,639	10,833	9,479	8,426	7,584
1976	1,020,000	1,904	12,774	11,178	9,936	8,942
1977	1,200,000	17,534	15,029	13,150	11,689	10,520
1978	1,400,000	20,456	17,534	15,342	13,637	12,274

Calculated on the basis of the formula:

$$R = \frac{RA \times LS}{365 \times RF \times oF}$$

R = Number of Rooms

VA = Number of Visitors P.A.

LS = Average Length of Stay - 4 Days

oF = Percentage Occupancy

RF = Rooms Factor - 1.25 (40% Double & 60% Single)

Note: Hotel classification by the Taiwan Tourism Bureau Year of 1968

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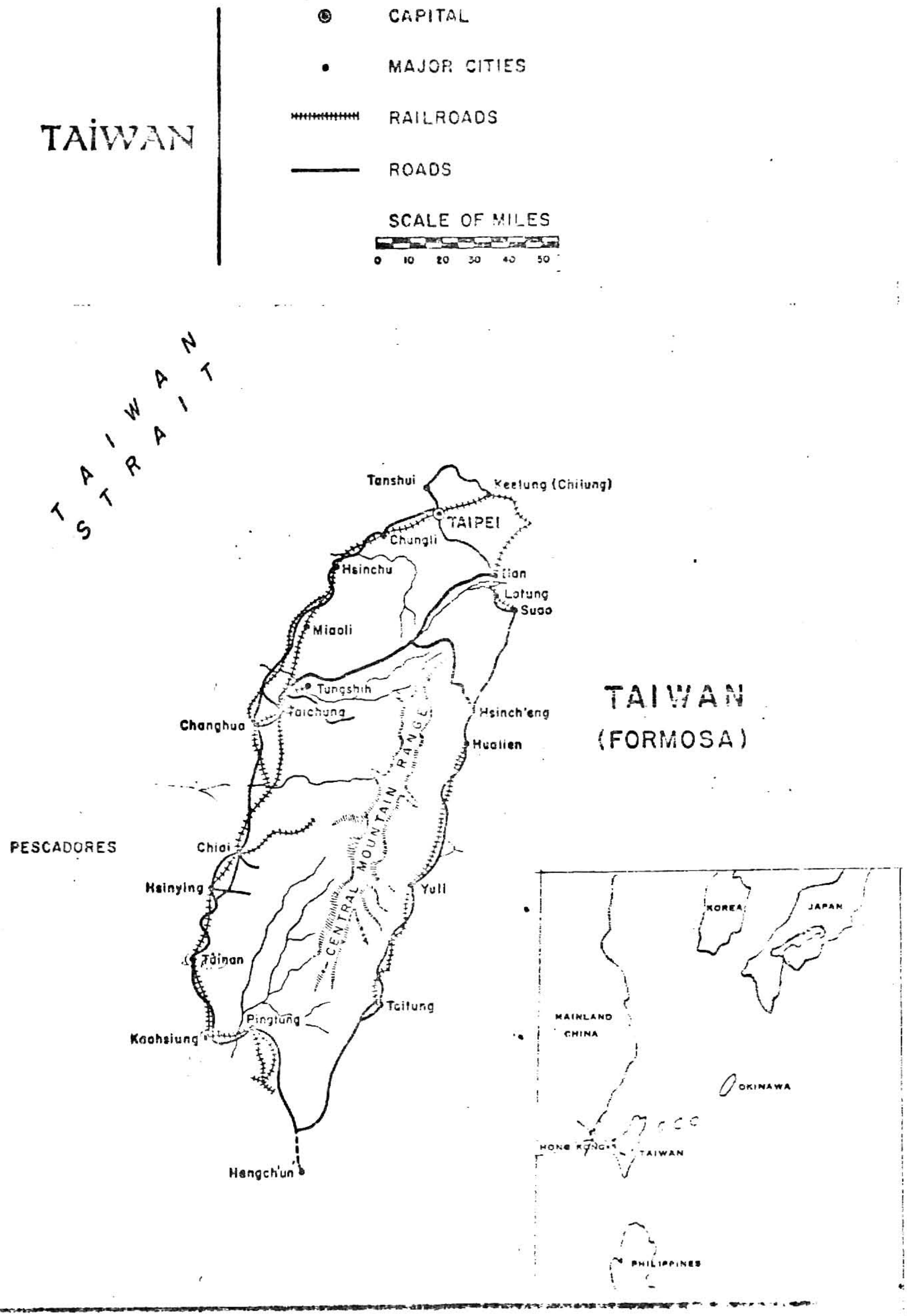
TAIWAN
CAPITAL
MAJOR CITIES
RAILROADS
ROADS
SCALE OF MILES
0 10 20 30 40 50
TAIWAN STRAIT
Tanshui
Keelung (Chilung)
TAIPEI
Chungli
Hsinchu
Ilan
Lotung
Suao
Miaoli
Tungshih
Taichung
Changhua
Hsinch'eng
Hualien
CENTRAL MOUNTAIN RANGE
PESCADORES
Chiai
Hsinying
Yuli
Tainan
Taitung
Pingtung
Kaohsiung
Hengch'un
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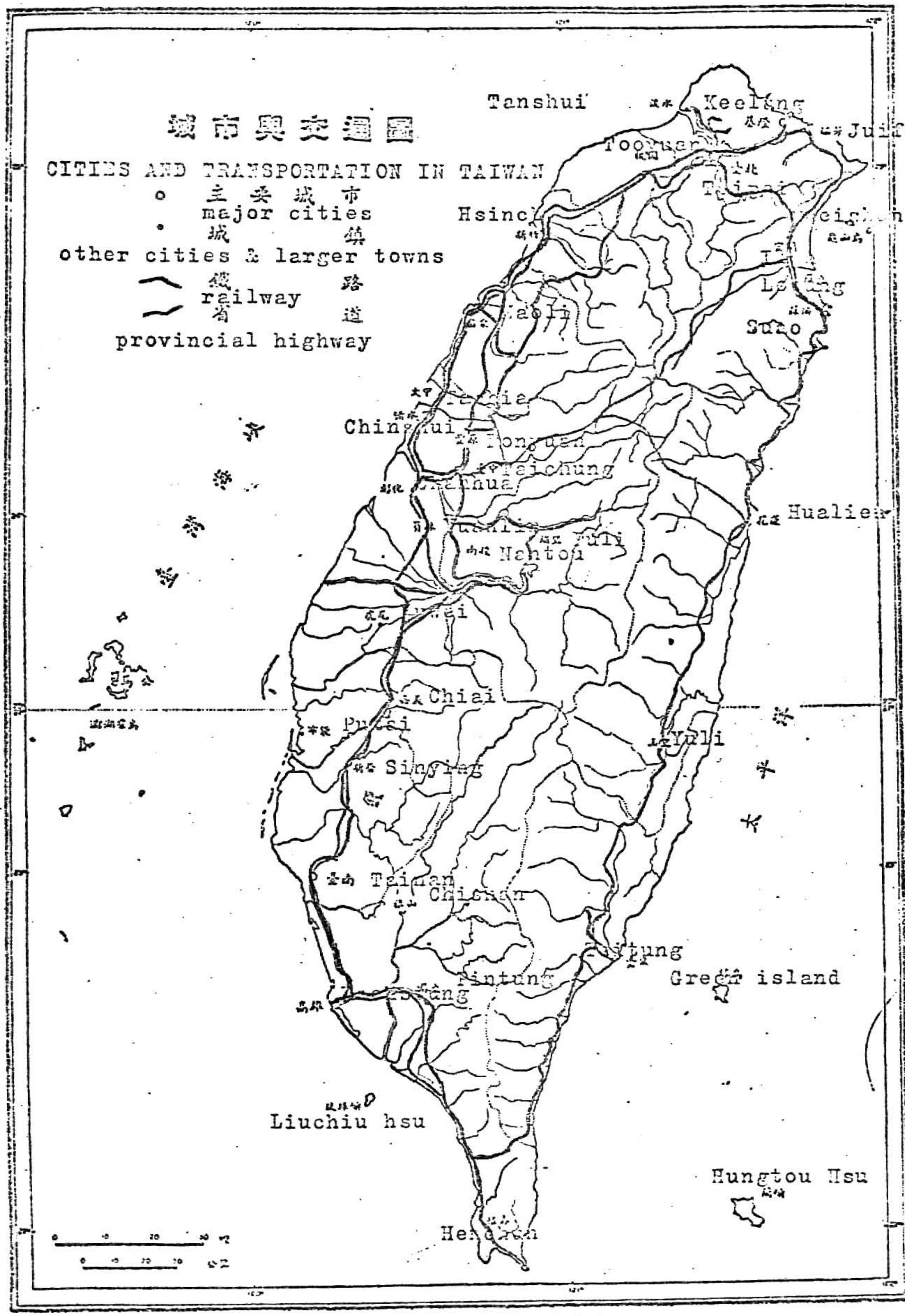
KOREA
JAPAN
MAINLAND CHINA
OKINAWA
HONG KONG
TAIWAN
PHILIPPINES



Cities and transportation in Taiwan.

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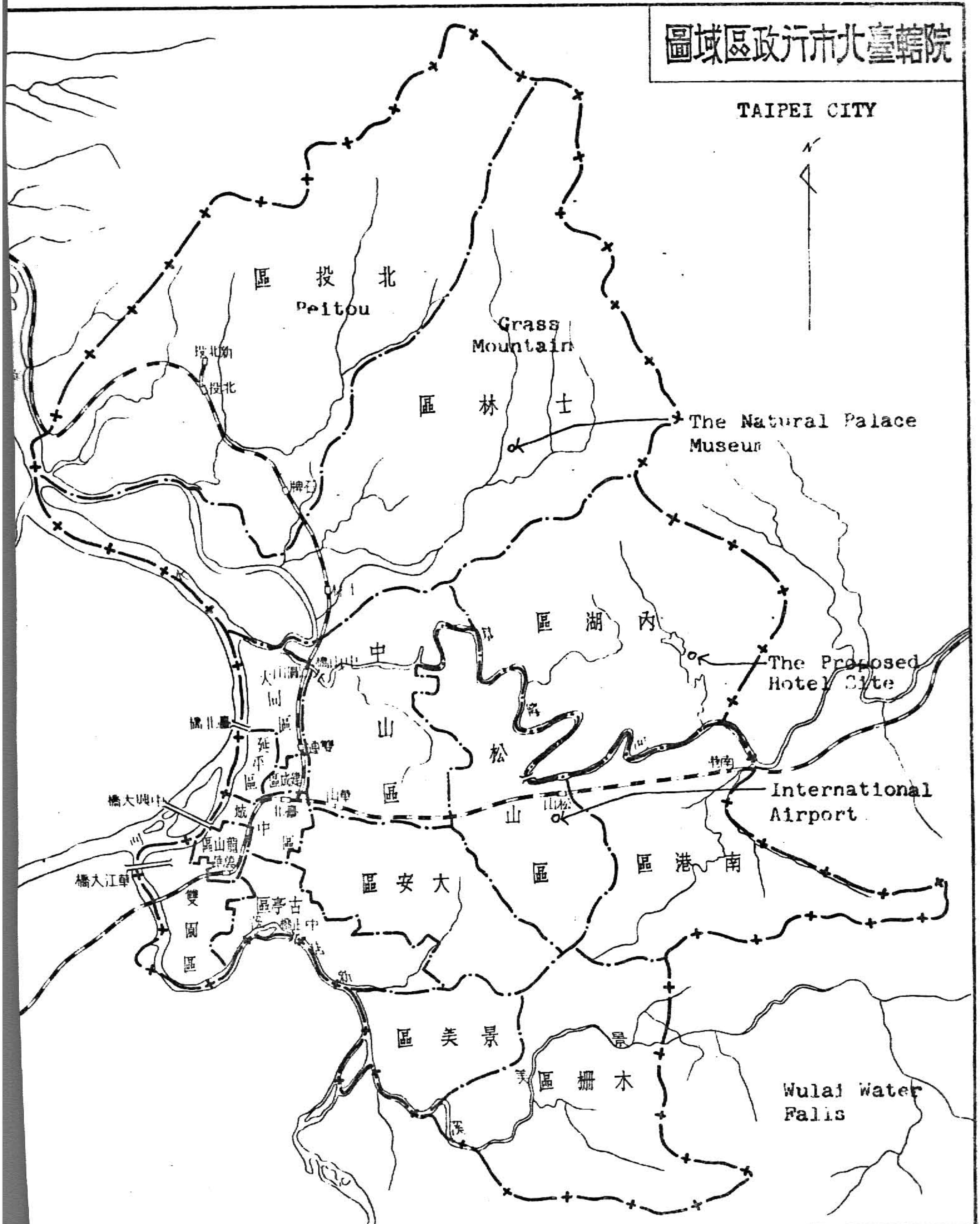


院轄臺北市行政區域圖
TAIPEI CITY
N
北投區
Peitou
Grass Mountain
士林區
The Natural Palace Museum
內湖區
The Proposed Hotel Site
中山區
松山區
International Airport
大同區
延平區
城中區
龍山區
雙園區
古亭區
大安區
南港區
景美區
木柵區
Wulai Water Falls

B. PROJECT PROGRAM

1. Purpose of Project

All hotels have a common denominator - Man. They are designed to serve his basic needs: recreation and relaxation. Wherever located, whatever its size or standard of service, the hotel is built with one object - to enable food, drink and lodging to be provided the paying customer- and the success of the business is affected by the design of the building - the atmosphere which is created, the comfort, the working conditions of the staff and the efficiency of the mechanical services.

The broad principles of hotel design have been established by experience and, to some extent, by tradition. Each building, however, must be adapted to suit the particular requirements of its environment and clientele. Although the function of a hotel is to provide food, drink, and shelter, the importance given each varies with different types of hotels. The shape and size of the building will depend upon the emphasis given to the various aspects.

There will be other differences in individual buildings determined by personal tastes, climatic conditions, and national temperaments, but the principles governing the design of hotels are common throughout the world because of their relationship to the needs and habits of man.

The first step in the planning of a new hotel should be the establishment of a clear idea as to the type of hotel desired. This will be determined by the character of the place in which it is to be built and the kind of patrons it is to serve.

The tourist hotel that is sufficiently different and interesting to become talked about, advertises itself; it attracts tourists. Other things being equal, it has a much greater chance of success than the hotel that is commonplace.

The appropriate design character is a very valuable asset to a tourist hotel. If a hotel has the right atmosphere, it can fit in with the tourist's attitude and increase his enjoyment of his trip. People who find the atmosphere of a hotel to their liking not only advertise the hotel, but also are much more contented and easier to please.

New travel habits, especially in business, new travel patterns due to the jet airplane, and increased leisure and vacation time, are changing the locations, sizes, and services of hotels. Today most hotel operators expect their guests to use their rooms for more than sleeping. Commercial men use them for work, conference, and as display showrooms; vacationers use them for entertainment. This is why the proposed hotel is going to have large public facilities for meetings, banquets, exhibitions, etc. Of paramount importance in nearly all hotel design is site location. The proposed hotel is located at NEIHU, a suburb of Taipei city near the Taipei International

Airport. (See page 11)

The land to the south of the proposed site is mostly reserved for housing developments for the middle-income group and construction is in progress. On the north side the land is still undeveloped mountainous land which is part of a national park, the high level will be normally an elevation of 1,000 ft. to 1,200 ft. To the east is a small NEIHU town, of 10,000 people, and on the west is Ta Po Lake, the only lake around Taipei city. The NEIHU area has been part of a government renewal program since 1966 and it appears that the government is taking steps to ensure a high standard of development for the whole locality. It is therefore in the interest of Taipei that a hotel of international standard be built there to act as a catalyst for quality development.

Surrounding the site are several interesting places to visit:

a. Peitou is a picturesque village surrounded by wooded foothills where many Taipei residents make their homes since it is much cooler than the city during the summer months. It is approximately a 15 minute ride north of Taipei. (See page 11)

b. Grass Mountain, also known as Yang Ming Shan, is north of Taipei and is a favorite residential section. Parks covered with a profusion of flowers entice hundreds of visitors, particularly during the cherry blossom and azalea seasons. (See page 11)

c. Wulai Water falls, south of Taipei, is about an hour drive plus a short ride by push-cart. The road is quite scenic, leading through beautiful mountains. The push-cart, for those who would rather ride than hike to the falls, is on a small narrow-gauge track and flat cars loaded with visitors are pushed by villagers. The falls, although not the Niagara type, are the shutter bug's delight, particularly when the nude aborigine girls pose with the falls as the background. The girls also perform their native dances to the beating of drums.(See page 11)

d. The Natural Palace Museum, located in the Botanical Gardens in Taipei, has an exhibition that cannot be equaled any place in the world. (See page 11)

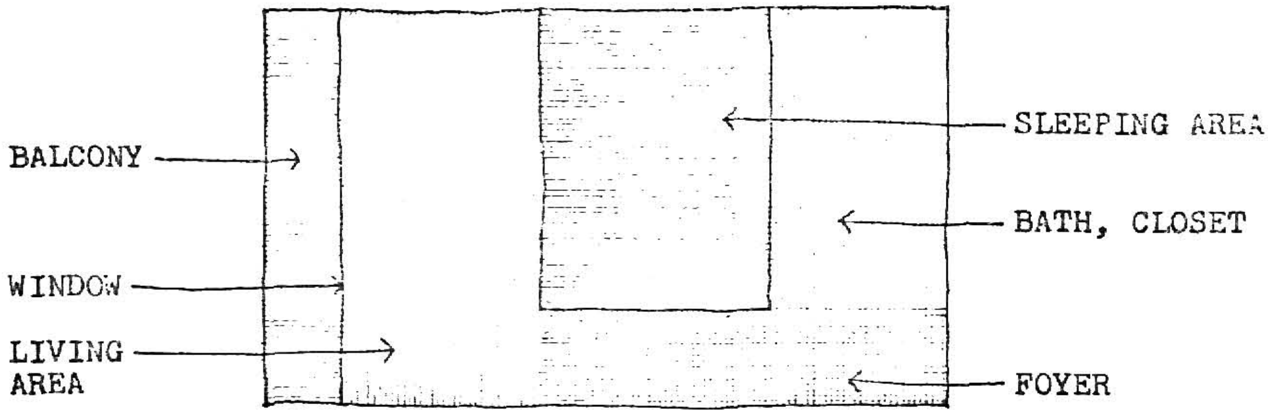
The museum holds 250,000 of China's greatest art treasures-paintings, calligraphy, porcelains, bronzes, jades, and other articles-originally in the collections of Chinese emperors. This museum is well worth several hours of visiting.

2. Space Requirement and Facilities

a. Living Facilities (See page 64)

There are 224 guest rooms in this hotel of which 5% are two room suites and 90% are double rooms. There are a number of inter-connected rooms (soundproof connecting doors) and some rooms that by size, configuration, and furniture can be combined into suites of various sizes. However, every room has a fully equipped bathroom, closet, and balcony so that it may be rented as a separate room.

The guest room functional plan is as shown.



The guest room is planned with the "living area" along the outside wall and extending down one side of the room. The other side of the room will become the "sleeping area". The space near the corridor is used for an entry foyer, bathroom, closet, luggage rack, and dresser. These areas overlap to some extent and may thus serve a double purpose, as well as adding a sense of spaciousness to the room.

It is generally considered that about 220 square feet should be allowed for a double room and 440 square feet for a two room suite. The shape of the double room is a semi-circle and the other is a circle. On each typical floor there are seven bedroom units which surround the elevators and fire escape stair.

The service area on the typical floor is located near the vertical circulation core (service elevator, dirty linen and trash chutes). The service area also contains space for storage of the service cart, a slop sink, and storage for clean linens, towels and supplies.

b. Dining Facilities

(1) Main dining room (See page 62)

On the second floor, there is a main dining room which is separated into three units - Chinese dining room, Japanese dining room, and Western dining room - by movable partitions. The total area of the dining room is 5,024 square feet. Allowing about sixteen square feet per seat for the dining room, it will provide tables for 300 people. A wide range of dishes will be provided, and the food will be served by the staff to the customer sitting at a table.

The food preparation & service room is at the center of the dining room because it is the shortest way to serve customers and will increase the working efficiency. A reception area adjoining the entrance to the dining room, also provides a lounge area. The public toilets are at lower level.

(2) Snack bar and coffee room (See page 62)

At the second floor of the guest tower, there are a snack bar and coffee room, where the customer receives his meal or coffee at a counter. Generally, however, in addition to the counter seating, a limited number of tables are provided, but in the true snack bar each customer is served directly from the counter with less substantial meals than are normally obtainable in a cafeteria. The total area is 3,180 square feet and it is a semicircular floor plan.

(3) Night club (See page 63)

The night club is at the top of the guest tower. There is a small stage for entertainment and a small counter with service area to serve guests. There is a very good view of Taipei City, especially at night, which people can enjoy while dining on delicious food and wine.

(4) Ball-room (See page 62)

Like the main dining room, the ball-room is one wing of the hotel. It is placed as close to ground level as possible so that non-residents of the hotel can reach all public functions without either traversing guest room areas or burdening elevators.

This arrangement simplifies traffic control and makes possible efficient elevator service at relatively low installation cost, and the conventional air conditioning required for public areas can all be supplied directly from the fan gallery immediately above the service core - short ducts need not cross guest room floors which have separate supply systems.

The ballroom is a circular plan with the service area and a small stage for orchestra entertainment at the center. The dancing floor is around the stage which is on a different level and the guests will sit around the dancing floor. There will be dressing rooms and toilet rooms and also a service elevator to the kitchen which is on the basement floor. The total area is 5,100 square feet.

(5) Conference rooms (See page 62)

One other major wing of the hotel complex is the conference facility which consists of a primary service area and three satellite structures which house three major conference halls.

Principle access to the conference areas is off the second level of the main lobby which has direct vertical links to the parking garage located at the basement level. Patrons will be greeted and directed to the appropriate conference room from the service and directory desk located at the entrance to the conference wing.

Each satellite unit has 3,317 sq. ft. and is capable of handling 150 people each. To accomodate meetings of various sizes and types, the spaces have been designed with convertibility and versatility in mind. The spaces have the ability to adapt easily and are equipped to handle various types of presentations. The structure has been designed so that the areas are open and unobstructed providing the flexibility to present large exhibitions or meet the needs of meetings and forums requiring various degrees of closure. Dining will take place in the several dining areas.

Again, like the main dining room and ball room wings, the conference areas have been located so that non-residents of the hotel need not traverse guest-room areas or burden elevators.

(6) Employee's dining room (See page 60)

In the basement are the employee's dining room and a small kitchen provided for the bellmen, maids, elevator operators and the like. Other employees such as the staff from the front office and the accounting department will usually eat in the snack bar or coffee room. Seats are provided for half of those on hand for the noon meal, since all do not eat at one time. Food service is cafeteria style with a simple menu. The total dining room area is 900 square feet which is determined on the basis of 14 square feet per seat and the number of employees to be seated at one time.

c. Kitchen Facilities (See page 60)

The service entrance is located out of view of the main entrance to the hotel but with direct access to a road capable of handling truck traffic. There is a loading dock, covered, to protect it from the weather. (Food and supplies will be unloaded and stored on this dock and should not get rain-soaked while waiting to be checked in.) The food storage and kitchens are located on the same level.

The specialty restaurants and the main restaurant will have their own kitchens down in the basement. Each kitchen has its own elevator for vertical service which makes the space more economical. There is a chef's office in every kitchen area with telephones and intercommunication systems to control the kitchen operation.

d. Miscellaneous (See page 60, 61)

Other requirements include an entrance lobby, information and service counter, lounge, public toilets for men and women, shop area, beauty shop, barber shop, employees' entrance, employees' lockers and toilets for men and women, general office, mechanical room, furniture storage, laundry room and linen room.

There are also a swimming pool, tennis court, golf course, and a picnic area around the lake.

3. Parking and Circulation (See page 60)

The main parking area for the hotel is located under the main dorm and it can accommodate 300 cars. Guests will usually get out of cars at the main entrance and have the hotel driver park the car for them. There are no "ugly parking lots" at the ground level, therefore, increasing the hotel garden area making the hotel more attractive.

In the hotel, the public circulation, which means resident guests and non-resident visitors, is simple and direct, along clearly indicated routes to show the visitors where the public rooms are located. The visitors can approach the dining room, cocktail lounge, conference room, and the snack bar without passing through any other room.

The service counter is located next to the main entrance and is functional for a resident to check-in or check out. The access to the guest rooms is directly off the service counter and segregated from any circulation routes which are being used by visitors going to the public rooms.

Most service rooms are in the basement. Here is located the staff entrance and parking spaces with staff circulation kept completely away from the parts of the hotel used by the public-except where a service is to be rendered to the guest by the staff.

C. ENVIRONMENTAL TECHNOLOGY

1. Climatology

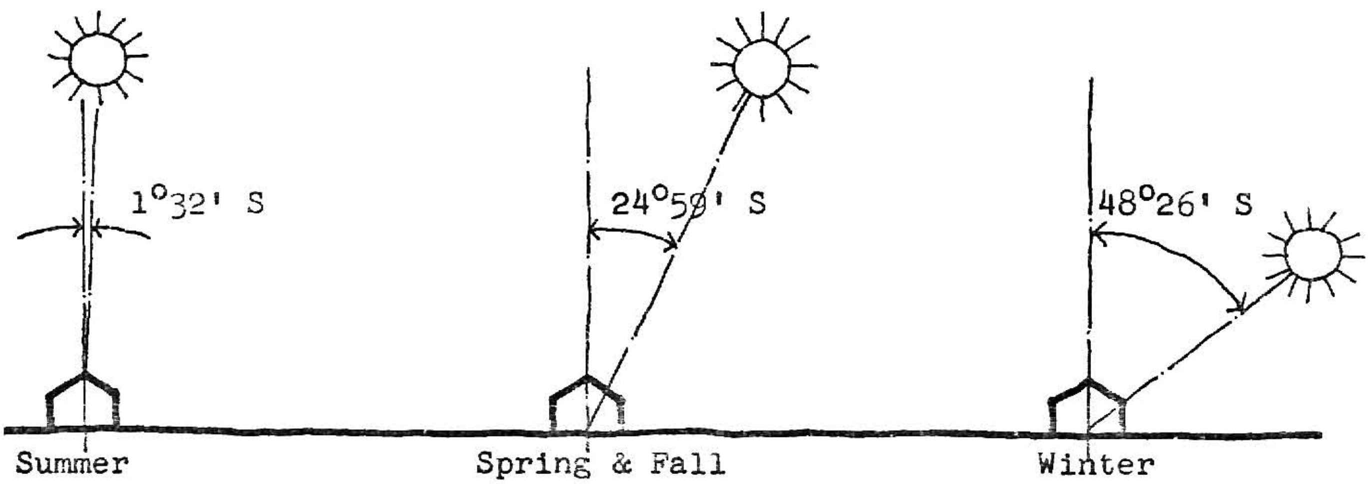
The climate around Taipei is subtropical, but not uncomfortably so. The average temperature is 77.2^{O}F., therefore, no heating is needed in Taipei because there are only a few cold days in the winter. Summer lasts from May to October with a mild winter in January and February. Rainfall is heavy, averaging 101.2 inches annually in this area, while, in other places on Taiwan there is an average of 92 inches. Because Taipei is located at the north end of Taiwan and surrounded by mountains, cooling showers are a familiar and welcome phenomenon.

The average velocity of wind is 2.7 meter/sec. In actuality, weather is conditioned by northeast winds in winter and southwest winds in Summer. Many typhoons blow up from the South China Sea, but on the average only three of them strike or sideswipe the city annually. Damage is minimized by a radar warning system and sturdy buildings. The typhoon season, from July to October, is also the monsoon season. Travelers are unaffected except for occasional plane delays. Average relative humidity is 81.5%. Earthquakes are frequent but rarely cause damage. In fact, few of them can be felt.

From the following table, we can get a clearer idea about Taipei's climate. This table was figured out by the Taipei Weather Bureau. From 1958 to 1968.

Month	Temperature in F	Rainfall in inch	Relative Humidity	Wind Velocity in meter/sec.
January	64.4	45.8	81%	3.2
February	58.8	73.7	84%	2.9
March	69.7	95.4	85%	2.4
April	75.2	113.2	85%	2.2
May	82.3	183.8	84%	3.1
June	86.0	192.5	82%	2.5
July	90.1	123.6	80%	2.3
August	91.4	174.2	79%	2.0
September	87.8	82.4	80%	2.1
October	80.7	30.3	78%	3.1
November	73.4	48.1	80%	3.3
December	66.2	52.2	80%	3.7
Total	-	1,215.2	-	-
Average	-	101.2	-	-

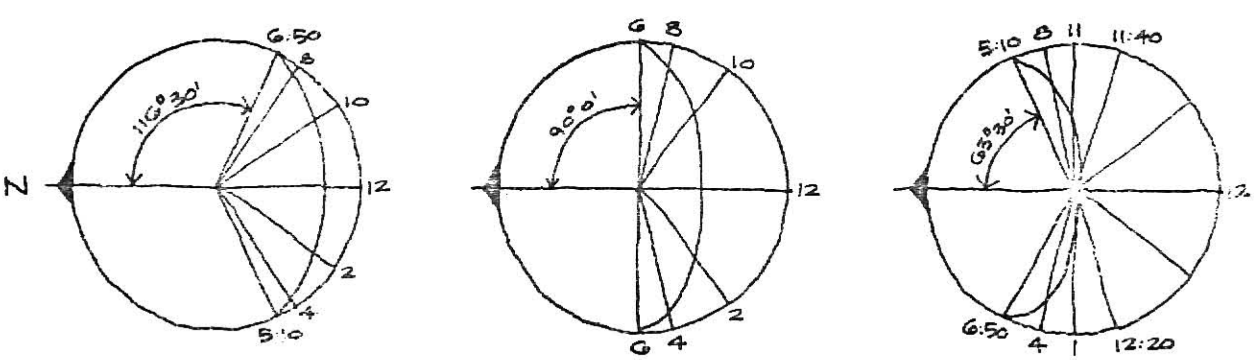
The latitude of Taipei city is north 25°-35' the same as Miami, Florida and longitude east 121°-25', placing it very near The Tropic of Cancer. As a result the sunlight is more or less shining directly from above. The solar angle is 1°32' south during summer, 24°59' south during spring and fall, and 48°26' south during winter at noon. We can get a clearer idea from the following sketches.



DIAGRAMS OF AZIMUTH AND ALTITUDE OF THE SUN

WINTER Dec 22 FALL Sept 23 / March 21 SPRING June 22 SUMMER

25° North Latitude



AM	PM	AZIMUTH	ALITIUDE	AM	PM	AZIMUTH	ALTITUDE	AM	PM	AZIMUTH	ALTITUDE
Noon		180°-0'	41°-30'	Noon		180°-0°	65°-0'	Noon		180°-0'	88°-30'
0.00.	2.00	146°-30'	33°-30'	10.00	2.00	126°-0'	51°-30'	11.40	12.20	107°-0'	85°-0'
8.00	4.00	125'-0"	14'-30'	8.00	4.00	103'-30'	27'-0'	8.00	4.00	78°-0'	35°-30'
6.50	5.10	116°-30'	0°-0'	6.00	6.00	90'-0'	0°-0'	5.10	6.50	63°-30'	0°-0'

2. Air Conditioning Requirements

Lying in the sub-tropic zone, the Taipei area has a mild climate all year round so that heating is not necessary for the Resort Hotel, but air conditioning will be extremely important.

In summer, outdoor air in Taiwan contains more moisture than it does in winter. Comfort in hot weather is much increased by cooling the air and reducing its moisture content. However, a limit should be set upon the difference in temperature between inside and outside air since too great a drop produces an unpleasant shock and sense of chilliness when one enters a room. In summer the relative humidity of outdoor air averages higher than it does in winter, and comfort in hot weather often requires a reduction in air vapor quite as much as a decrease in temperature.

Design analysis of air conditioning systems for hotels must consider facilities for dining, meeting, entertaining, and lodging, where air conditioning facilities must be capable of individual room control at all times. Individual thermal control for each lodging room limits the type of system to the following:

1. Self-contained units
2. Single duct with reheat coil in each room
3. Dual duct
4. Fan-coil units
5. Induction system

Self-contained units would have the lowest initial cost and space requirements, but a separate heating system would have to be installed unless heat pump units were furnished, as might be feasible in warmer climates.

The single duct with reheat coil system is not economical because the air has to be cooled to the lowest temperature required by any room, and air for the other rooms must be reheated as required. It also takes up more shaft and ceiling space than any system except the dual duct.

The dual duct system is seldom used for the sleeping areas because it requires the largest amount of shaft and ceiling space and has the highest first cost. This system is more adaptable to the dining and meeting room areas of hotels where the size of rooms is flexible and the load variable. In addition, large air quantities are desirable in these areas.

In new hotels where initial cost is the primary consideration, a fan-coil system is usually installed. Where ventilation of interior corridors is necessary, it is common to pressurize the corridor with conditioned outside air and exhaust this air through the bath rooms by way of the bedrooms. This will require undercut doors into the bedrooms but eliminates the need for outside air openings for each fan-coil unit.

Most new hotels use the induction system. This system provides a closer degree of control than fan-coil units, is quieter and gives better results in seasons when the outdoor temperature is between 40 and 50 F. Maintenance costs are lower than for the self-contained and fan-coil systems.

A refinement of the fan-coil and induction systems that is being used in hotels is the three pipe system. The slightly higher initial cost and space requirements for the third pipe will be offset by reduced operating costs.

Whichever type of air-conditioning system is used, a source of hot water or steam is usually available for heating the building. However, in milder climates, such as around Taipei, the central heating plant may be replaced by small gas fired or electric heaters in each room. Economics will determine which is more practical.

In determining cooling loads the east facade is usually the most critical one as far as the air conditioning load for the bedrooms is concerned, since it has a peak solar load between 6 and 8 A.M. when most people are still sleeping or just getting up. The noon solar peak on the south and 4 to 6 P.M. peak on the west are usually not as critical, even though the outside temperature is higher because the bedroom occupancy rate is much lower.

The dining, meeting and entertainment areas should be served by separate systems based upon the time these rooms will be used. If dual duct systems are furnished, then fewer air handling units will be required, thereby cutting down mechanical room requirements but increasing operating costs.

Very little diversity factor can be anticipated for the other areas since they may and probably will be used more or less simultaneously. Therefore, the refrigeration machines can be selected so that one serves the entire hotel or one unit may serve the bedrooms and a second serve the other areas. The latter's first cost is somewhat higher but operating costs may be lower because the bedroom areas generally can operate on a higher refrigerant temperature than the dining and meeting areas. Higher refrigerant temperatures usually mean lower fuel cost requirements. The ratio of bedroom to dining and meeting areas will generally determine whether it is feasible to consider separate refrigeration systems.

3. Lighting

Lighting plays a very important role in architecture. It relates to architecture in two ways: (1) in the kind and quality of light produced and in how this illuminates the space to reveal the contours and character of the building; (2) in the design of the light sources themselves and in their integration with the architecture as design elements. The lighting system should work in harmony with and not in opposition to or independent of the architecture.

Two kinds of lighting are included here - natural and artificial. Both are important and should be considered.

First, daylight is variable in quantity and in colour continuously throughout the day. Daylight has a different spectral composition from any form of artificial light, and while the colour appearance and to some extent the rendition of colours given by daylight can be simulated artificially, the simulation is not perfect.

Probably the real advantages of daylight, however, are to be sought not so much in the spectral composition of the light, though that is important, nor in the variability, which is important also, but more in the fact that daylight is provided by windows which have the dual function of not only admitting light, but also providing us with a visual rest center, an amenity which offers a link with the outside world.

The role of daylighting in a building may conveniently be considered in two broad categories; first, the ways in which it helps people to see well, and second, the contribution which it makes to the amenity and general character of the building.

Daylighting in a building has the primary function of enabling people to see. However, the architect must be also concerned with the way in which the solution to this lighting problem interacts with other aspects of the building. It has been observed that the method of daylighting and the distribution of windows has a definite effect upon the layout and form of the building both in plan and section. Again, the visual character of the interior is primarily dependent upon the means by which daylight is brought into the building and the way in which the interplay of light and shade is used to reveal form, surface, and space.

The secluded view of a small domestic window or the inviting sweep of a fully glazed front each have their place, and each helps to set the tone of the building both from inside and out. In a different way the proportions of direct and indirect daylight will have a marked effect upon its character. A high proportion of direct light will give strong modelling and a rather heavy dramatic character. On the other hand, a room with a high proportion of indirect light will have lower contrasts and a softer, more restful character.

Whether interior daylight is planned for appearance or for the reading of small print, it can only be planned by making certain assumptions about the brightness of the sky. These assumptions can be made on the basis of average sky conditions, or they can be based on limiting conditions which need not be either maximum or minimum conditions.

The techniques of artificial lighting are undergoing radical change and appraisal in terms of design methods and design principles. The development of artificial lighting during the last fifty years has been essentially a change from local lighting from small light sources of low power to general lighting of the whole building supplemented by special lighting where needed.

The simple and basic need of artificial lighting is to "provide illumination to read fine print." It has been established beyond any reasonable doubt that the provision of more light enables people to do finer visual work and appreciate color in greater richness. Artificial lighting is required to:

1) light the building after dark
2) supplement daylight where necessary
3) provide special lighting on difficult visual tasks
4) maintain attention on the work
5) ensure safety and alertness

The first two requirements demand a general distribution of light about the building in sufficient quantity. The last three requirements can be met by a combination of suitable building lighting and localized lighting controlled strictly with reference to the points where it is needed.

Beyond creating the conditions for efficient and comfortable visual performance, artificial lighting should be designed to help in revealing in three dimensions the visual qualities of a building. In addition, the artificial lighting has an important and subtle part to play within the design as a whole in helping to establish the character of an interior and thus the attitude or mood of its occupants.

To be successful both in creating the visual conditions which allow people to see well and comfortably and in helping to reveal the architectural qualities of a building, and to create the right character for the interior, it is necessary to ensure that:

1) the relation between daylighting and artificial lighting is considered from the earliest stages in design.
2) each is used in a way that exploits its special quality; the variety and directional characteristics of daylighting, the constancy and instant availability of artificial lighting.

Lighting of the rental unit should be one of the features most carefully considered in its planning and equipment, for the room will be used mostly at night; and this single room must satisfy a wide variety of different needs. There must be subdued general lighting, then brighter, specialized lighting in various spots for specific uses. Switching is also important. General lighting should be controlled from the entrance and also from the bed head.

General lighting can be of low intensity. This means that it may be a widespread source such as a fluorescent valance or cove light, or it may consist of scattered high - intensity light sources, either deeply recessed in the ceiling or hung below eye level and shielded by an opaque shade. Such lights are most successful when placed so that they high - light and spill over some decorative feature.

For the sitting area economy suggests the standing lamp, which can provide low-intensity general lighting at the same time as a high - intensity reading light for two easy chairs. The hourglass wall lamp will give about the same result. It has no dangerous cord and is never in danger of being knocked over, but it freezes the reading light to one position in the room. It is probably best suited to the increasingly popular sofa bed plan when it serves as a bed head light as well as a reading light. A recessed overhead spot, if used as a reading light, must be supplemented with some low-intensity general lighting. It tires the eyes to read in a pool of high - intensity light surrounded by blackness. Being inconspicuous any recessed ceiling spot will increase the apparent size of a small room.

Closet lighting may be combined with lighting of the entrance hall. The light may be on the closet ceiling, perhaps a fluorescent tube fixture, and spill into the hall through a glass panel; or a hall ceiling light may be diverted by louvers or lenses to shine brightly into the closet.

Bed head lighting, in the case of a pair of beds, must be flexible enough to serve two individuals of differing tastes. It is better if one of the two can read in bed without a light shining into the eyes of anyone who may be attempting to get to sleep in the adjoining bed. It is, therefore, not usually satisfactory for the bed head light to serve also as general over-all lighting for the room. A fluorescent tube in a two-way trough above the bed head, for example, is satisfactory only if combined with individual reading lights, one above each bed. Recessed, Lensen ceiling lights, which confine the light to a small reading area, are good but expensive. Ordinary table lamps with translucent shades are satisfactory if placed at the outer sides of the two beds. In all cases there should be a switch at the bed head to control the general room lighting.

In the dressing area there must be well-lighted mirrors, preferable one for a wash basin make-up counter as well as a full-length mirror. The main requirement is sufficient light from all directions without excessive glare. A light-colored counter top is practically essential, so that light from top and sides is bounced back to the face from below.

Suggested lighting for other areas of the hotel are as follows:

1) The entrance foyer should have a high level of illumination in order to create a smooth and comfortable transition between the brightly lighted marquee or bright daylight and the lobby.
2) The lobby should have a pleasant level of general illumination with higher-level lighting in special location such as the desk, news stand, telephones, display, shops, etc. Lighting methods usually combine direct and

indirect lighting. Totally indirect lighting may result in overly bright ceilings and insufficient shadows for perception of the third dimension; down-lighting used exclusively may produce sharp shadows and unpleasantly dark ceilings. Luminous ceilings combine the best features of direct and indirect lighting.

3) Lounge lighting calls for a softer treatment, and the general illumination level can be somewhat lower. Local lighting, often in the form of portable lamps, should be provided for reading. Properly located outlets are required if portable lamps are to be used.

4) Adequate corridor lighting creates a pleasant atmosphere and makes it easier to read room numbers and find door keyholes. Well designed ceiling fixtures spaced at intervals of twice the ceiling height usually give adequately uniform illumination. If possible, corridor switches should be placed near guest room doors. Building codes require emergency lighting for hotel corridors which will operate in the event of failure of the normal source of electricity.

5) Services areas should be lighted in accordance with the visual tasks. In areas where the seeing task is not critical, sufficient illumination should be provided for safety and easy maintenance.

6) Stairs, elevators, and moving machinery should

be well lighted for safety. Pilot lights are recommended for rooms that are rarely entered.

4. Acoustics

One of the basic objectives in the design of spaces for buildings is the provision of a satisfactory acoustical evironment. Simply stated, a satisfactory acoustical evironment is one in which "the character and magnitude of all the sound are compatible with the satisfactory use of the space for its intended purpose." Unfortunately, this statement of objective is not so easily put into simple numbers that the architect can work with. Just as the architect cannot say that 70 F is the ideal temperature for all of the spaces in a building, so one cannot simply say that the maximum noise level shall be 30 db. Because we are dealing with human beings whose adaptability to measurable quantities of heat, light, and sound vary over wide limits, the selection of optimum numbers is a rather complex business.

In architectural acoustics we are interested in two very simple objectives: (A) provision of a satisfactory acoustical environment; (B) provision of good hearing conditions. In many situations we are concerned only with the environment, but often good hearing is an equally important objective of design.

Simply, sound is a physical wave motion in air. It consists of to-and-fro motions of molecules in the air which create a series of compensations and rarefactions.

Therefore, when a sound wave encounters a sizable obstacle, such as a wall or ceiling, part of it will be reflected, part of it will be absorbed, and part of it will be transmitted to some adjoining space. The relative magnitude of these three parts of the original sound is determined by the physical properties of the obstacle. A hard-surface, dense plaster, for example, will reflect a great deal of the sound which strikes it, while a soft surface, such as a heavy carpet, will reflect very little back into the space. Absorbtion and reflection may be all that we are concerned with if we restrict ourselves to the space in which the sound originates. But, we must also concern ourselves with the part that is transmitted to the adjacent space. A porous, or lightweight obstacle, will transmit a large part of the original sound energy to an adjoining space and give very little sound isolation. The mechanisms governing absorption or insulation and isolation are quite different, and must be clearly understood if we are to predict accurately the acoustical environment in the finished rooms.

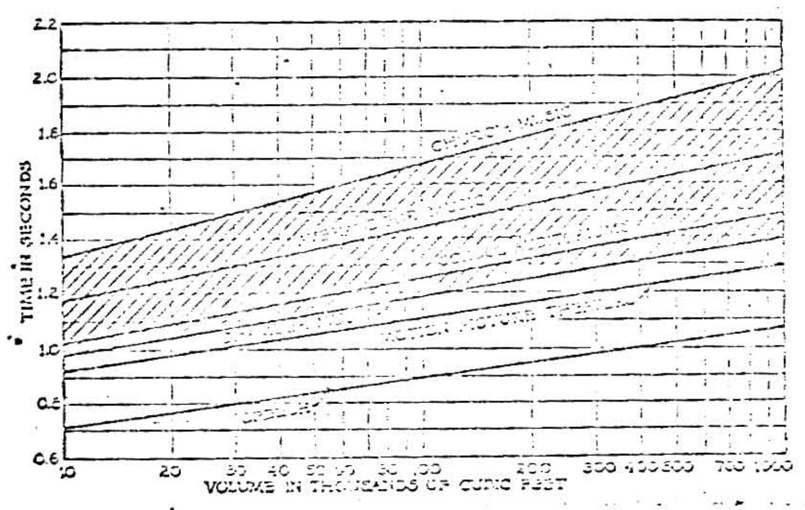
Useful absorption of sound in buildings is provided by all sorts of porous, fibrous materials. Carpets, draperies, upholstered furniture, and specially designed acoustical blankets and tiles, all provide significant sound absorption. The sound waves in the air move into these porous materials and, by frictional drag of air particles on fibers of the material, energy is lost in heat and this fraction of energy is never recovered as sound. Therefore, when porous materials are placed within a room, the reflected energy is greatly reduced, and sound dies away rapidly rather than being reflected many times from the enclosing surfaces. These sound insulators, because they are porous and admit moving molecules in the sound wave, will also transmit a great deal of sound - meaning that a good sound absorber is nearly always a good sound transmitter.

Unlike the sound absorptive materials, the sound isolating properties of a barrier are determined largely by its weight. Since sound waves consist of back-and-forth motion of molecules in air, it follows that when these particles strike an obstacle they will attempt to move it back and forth. If the obstacle has a great deal of weight (inertia) it will resist being moved, where as, if it is relatively lightweight it may move quite a lot. In a sense, a wall may be considered as a loud-speaker diaphragm with the new sound wave being created on the other side of the obstacle.

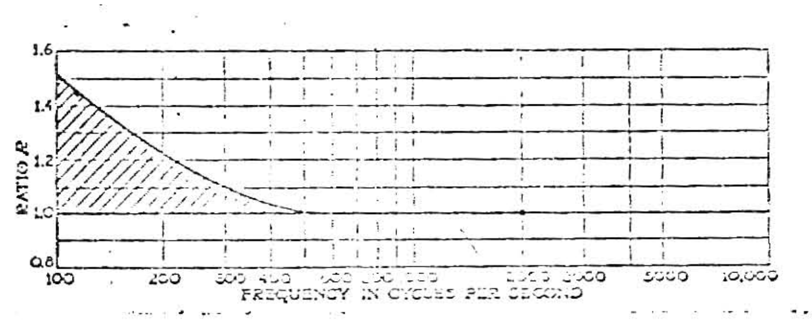
A point worth noting here is the rather different order of magnitude of reduction of sound energy involved in sound isolation as compared with sound insulation. A good sound isolator, for example a 4-in. brick wall, will provide a sound transmission loss of aproximately 40 db in a significant frequency range. A transmission loss of 40 db means that only 1/10,000 of the energy which strikes one side of the wall is reradiated on the other side. A good sound absorber, however, may absorb as much as 70 or 80 percent of the incident sound energy. The other 20 or 30 percent is reflected back into the room to be absorbed at another contact - or perhaps transmitted on through if the sound-absorptive material is not backed up with a heavy impervious material. This 20 or 30 percent is certainly greater than the .01 percent that passed through the 4-inch brick wall. If the sound-absorptive material does transmit 20 percent of the incident sound energy, its sound-transmission loss would be about seven db - equal to the kind of insolation provided by about a 1/8" thick plywood wall. The above example illustrates that not only the mechanisms of insulation and isolation are different, but that the results achieved are of very different orders of magnitude.

A. Acoustical Design of Hotel Concourse:

The reverberation time of this lobby should be not more than two-thirds to three-fourths of the optimum time for speech. From the figure below, the optimum reverberation time at 500 cycles for speech in a room of 883,000 cu-ft. is 1.07 second.



And from the figure below, the ratio R is 1.45 and 1 for 125 cycles and 2,000 cycles, respectively. The reverberation time at 125 cycles and 2,000 cycles is 1.52 sec. and 1.07 sec. for speech.



But for conversation, the optimum reverberation time should be cut down to two-thirds to three-fourths as mentioned above. So the reverberation time in this lobby should be 1.0 sec., and 0.7 sec., and 0.7 sec., for 125 cycles, 500 cycles, and 2,000 cycles.

Main Lobby:

$$V = 883{,}000 \text{ cu-ft}$$

$$S = 91{,}605 \text{ sq-ft}$$

$$t = \frac{0.05 \times V}{S\,(-2.30 \log_{10} \underline{1-\bar{\alpha}})}$$

A. REQUIRED ABSORPTION

	125 cycles	500 cycles	2,000 cycles
Optimum reverberation time in sec.	1.0	0.7	0.7
$-2.30 \log_{10}(1-\bar{\alpha})$	0.481	0.688	0.688
$\bar{\alpha}$	0.38	0.495	0.495
Total sq-ft-units of absorption required $= S\bar{\alpha}$	34,809.90	45,344.48	45,344.48

B. Absorption Furnished by Surfaces, Chair & People

Absorption Material	Area/ sq-ft	125 Cycles		500 Cycles		2,000 Cycles	
		Coef.	Units	Coef.	Units	Coef.	Units
Floor							
Carpet on Concrete 7/16"	37,324	0.12	4,474.80	0.28	10,895.20	0.21	7,844.00
People Seated	100 people	3.2	320	3.8	380	4.5	450
Empty Seats	80 seats	2.5	200	3.2	256	3.5	280
People	50	3.0	150	4.5	225	5.0	250
Ceiling							
3" Wool Blanket Type TW-F	37,820	0.68	25,796.00	0.95	34,989.00	0.87	32,974.00
Wall							
Glass	9,860	0.03	295.80	0.13	295.80	0.02	197.20
Wood Veneer	4,176	0.11	459.36	0.15	626.40	0.10	417.60
Brick Screen	2,425	0.4	970	0.85	2,061	0.65	1,576.25
Air							
per 1,000 cu-ft	-	-	-	-	-	2.3	2,030.90
Total Surface Area	91,605						
Total Absorption			32,665.96		49,728.65		46,019.95

Checking Reverberation Time in Lobby

I. 125 Cycles.

$$\bar{\alpha} = \frac{32,665.96}{91,605} = 0.357$$

$$-2.30 \log_{10}(1-\bar{\alpha}) = 0.44$$

$$t = \frac{0.05 \times 883,000}{91,605 \times 0.44} = 1.092$$

1.99>1.092>0.91 O. K. (error within 10%)

II. 500 Cycles.

$$\bar{\alpha} = \frac{49,728.65}{91,605} = 0.542$$

$$-2.30 \log_{10}(1-\bar{\alpha}) = 0.776$$

$$t = \frac{0.05 \times 883,000}{91,605 \times 0.776} = 0.621$$

0.79>0.621>0.61 O. K.

III. 2,000 Cycles.

$$\bar{\alpha} = \frac{46,019.95}{91,605} = 0.503$$

$$-2.30 \log_{10}(1-\bar{\alpha}) = 0.70$$

$$t = \frac{0.05 \times 883,000}{91,605 \times 0.70} = 0.689$$

0.79>0.689>0.61 O. K.

B. Ball Room Acoustical Design:

$V = 89{,}889$ cu-ft

$S = 16{,}526.95$ sq-ft

$$t = \frac{0.05 \times V}{S(-2.30 \log_{10} 1-\bar{\alpha})}$$

A. REQUIRED ABSORPTION

	125 cycles	500 cycles	2,000 cycles
Optimum Reverberation Time in Sec.	1.30	0.9	0.9
$-2.30 \log_{10}(1-\bar{\alpha})$	0.208	0.302	0.302
$\bar{\alpha}$	0.185	0.26	0.26
Total sq-ft-units of absorption required = $s\bar{\alpha}$	3,060	4,300	4,300

B. Absorption Furnished by Surfaces, Chairs & People

Absorption Material	Area/ sq-ft	125 Cycles		500 Cycles		2,000 Cycles	
		Coef.	Units	Coef.	Units	Coef.	Units
Floor:							
Carpet on Concrete 7/16"	1,589.60	0.12	190.8	0.28	445.2	0.21	333.90
Cork Floor	560	0.04	22.4	0.05	28.00	0.07	39.20
Seated in Upholstered Seats per sq-ft of floor area	2,384.4	0.6	1,430.64	0.88	2,098.27	0.93	2,217.49
People (waiters)	30	3.0	90	4.5	135	5.0	150
<u>Wall</u>							
Wood Wainscot (Slat)	1,450.50	0.3	435.15	0.9	1,305.00	0.8	1,160.40
Plywood Paneling, 3/8" Thick	2,521.60	0.28	706.04	0.17	428.67	0.10	252.16
Glass	2,845	0.03	85.35	0.03	85.35	0.02	56.90
<u>Ceiling</u>							
Rough Concrete	5,175.85	0.01	51.75	0.02	103.5	0.02	103.5
Total Surface Area	16,526.95						
Total Absorption			3,012.43		4,618.99		4,316.55

Checking Reverberation Time in Ball Room

I. 125 Cycles

$$\bar{\alpha} = \frac{3,012.43}{16,526.95} = 0.184$$

$$-2.30 \log_{10}(1-\bar{\alpha}) = 0.201$$

$$t = \frac{0.05 \times 89,889}{16,526.95 \times 0.201} = 1.35$$

1.39>1.35>1.21 O. K.

II. 500 Cycles

$$\bar{\alpha} = \frac{4,618.99}{16,526.95} = 0.278$$

$$-2.30 \log_{10}(1-\bar{\alpha}) = 0.325$$

$$t = \frac{0.05 \times 89,889}{16,526.95 \times 0.325} = 0.836$$

0.99>0.836>0.81 O. K.

III. 2,000 Cycles

$$\bar{\alpha} = \frac{4,316.55}{16,526.95} = 0.261$$

$$-2.30 \log_{10}(1-\bar{\alpha}) = 0.301$$

$$t = \frac{0.05 \times 89,889}{16,526.95 \times 0.301} = 0.902$$

0.99>0.902>0.81 O. K.

5. Landscaping

"Where site and structure meet we may well 'structure' the site and at the same time 'wash' the landscape over and into the structure" - Hides Sasaki.

The above quote suggests to us that the well conceived project entails more than the application of a function to a plot of land, which means planning without regard to the forms, forces, and features of the total site. It also suggests that one cannot go to the other extreme of complete adaptation of the project to the site. The quote does, however, begin to imply that we integrate program functions and site functions to achieve harmonies of esthetics and function. But even more, it suggests that the ideally conceived project is one in which the ideal program functions are conceived in awareness of the highest potential of the site. This ideal site-project expression may be achieved through either harmony or contrast of the project with the forms, planes, or character of the site, or through a combination of both. Unsuitable site factors should be modified or eliminated, while suitable factors should be developed and accentuated. Structure and modified site should be planned together as one.

Before beginning design it will be necessary to classify a site according to its general landscape expression and to determine what design characteristics of a proposed structure are suggested by the site characteristics revealed. In working with the dynamic landscape qualities of the NEIHU site, the hotel complex evolved toward a terrace scheme with the hotel tower exploiting the dominance of the hill's crest. The theater, garden, clubhouse, and pool deck gently ramp themselves down the slope allowing the landscape to move in and around each of the terraced areas. Structure and landscape clearly work together to make the experience of strolling from hotel tower to the individual decks a pleasant one. In addition to the varying elevations, additional interest will be maintained by creating enjoyable environments in each area, whether it be the tranquil mood established at the garden level with its patterned brick pavement, bamboo plantings, and spraying fountain, or the active pool-clubhouse terraces.

Beyond the terraces are the picnic areas and the 9-hole golf course, thus one moves from the purely man-made structural form of the hotel tower to the transitional terrace-garden to the natural picnic - forest areas near Ta Po Lake. The design objective of creating a complex in harmony with its total site is complete.

6. Structure

The structure of the building will depend on the size, the site, the nature of the ground, the cost, and special measures due to peculiar fire risks or natural hazards. Irrespective of whether it is constructed of steel, concrete, brick, or wood the basic structure of a hotel can be divided into two parts. The first is the public rooms, which are relatively large-span areas through which movement is required with as little restriction as possible. The second are the bedrooms, which are essentially cell-like units which require complete segregation from each other. In both instances the creation of the environmental space will be largely determined by the structural system employed.

Due to its economical use of construction materials, the simplicity of its structural action and to its inherent beauty, the hyperbolic paraboloid is now a project type in design buildings across the world. It requires less concrete for a given area than is needed for conventional roof construction, and, since its compound curves actually consist of straight lines, it can be formed relatively easily of stock lumber.

The hyperbolic paraboloid utilizes efficient use of materials by relying on form or shape for strength rather than on mass. All material in the cross-section of the shell is uniformly stressed because of double curvature which enables loads to be tranferred to supports entirely by direct forces.

The use of the hyperbolic paraboloid system will be in the main lobby-exhibit building of the hotel complex. The structural ribs, of reinforced cast-in-place concrete will be left exposed for visual interest and acoustical purposes.

The guest rooms will use individual elliptical structural units consisting of a self-supporting shell of sandwich construction - polyurethane foam between two fiberglass-reinforced polyester layers. The unit can be easily transported and fitted together on the site.

The guest tower will be circular in form and consist of a slip-formed service core which will be capped by a tension ring. The individual guest room units will then be "plugged-in" along platforms suspended from cables tied to the tower's tension ring, thus providing a very flexible even recyclable structure - the units can be removed, transported elseswhere, and be reused, if the need were ever to arise.

The remaining buildings of the hotel complex will be tension structures in nature. Consisting of a slip-formed service core from which the remainder of the building will be cantilevered assymetrically and tied to the core by means of tension cables.

7. Materials

The NEIHU Resort Hotel will be built of reinforced and precast concrete - except for the hotel tower with its individual polyurethane units. The interior will be predominantly concrete used in a variety of forms, shapes, and textures, made dramatic by special lighting and set off by intervening uses of wood, metals, glass, and textured fabrics.

Striated concrete walls will be used in many areas, not only because its rugged texture has great sculptural richness, but because of the practical advantages of such a material - durability, no maintenance and nobody touches it. Another reason is that this type of texture works very well against warm, natural materials - wood, leather, against strong colors and rich fabrics.

There will also be many luxury contrasts to this dramatic concrete background. Floors will be parquet or else carpeted in a high quality contemporary broadloom. Public area furniture will be of strong accented fabrics, and some of this same fabric will be used on occasional wall areas as maximum contrast to the concrete. Much natural finished wood, satin finished metals, glass, and occasional painted surfaces, will set off the public areas and stairways from the concrete walls and backgrounds.

The guest rooms, dining rooms, and function rooms, will depart from the concrete theme into more contemporary moods.

The use of concrete, with its various textural treatments, will carry out to the terraced spaces with the addition of brick and natural stone paying patterns.

8. Water Supply and Sanitation

As we are beginning to see, few buildings have such complex services as a hotel. They represent a substantial proportion of the capital cost of the building and they are a major factor in the design. Very often a hotel will be judged on the quality of the services. Inadequate hot water, noisy plumbing or unsightly pipes may destroy any good impression created by well-designed furniture or decorations.

Buildings such as hotels are required to carry 24 hours supply of water for use if the main supply should fail, and storage tanks must therefore be provided at high level. Drinking water must be taken off the rising main in the interests of hygiene and safety against contamination. Draw-off points should be provided at least in the kitchen and each service room.

The tank room must be sufficiently high to give an adequate head of pressure at the highest draw-off point. If the main pressure is not sufficient to push the water to this height, booster pumps or pneuostatic systems of storage and pressuring will have to be provided, and these should be automatically operated to maintain a constant level in the storage tank.

The hot water service is usually taken from a calorifier heated by a circuit from the heating boilers. In a system of any size the service should be a circulating one.

The hot water demand for a kitchen is very high and the water is required to be much hotter than in the rest of the hotel. Rather than trying to meet this demand from the central unit, it is better to provide separate water heating facilities in the kitchen itself, either by a completely independent system heating the water from cold or by boosting the temperature of the water taken from the main hot water service.

A header tank will be required on the hot water system, and this is usually placed in the roof-level tank room. It must be sufficiently high enough to give a reasonable head of pressure at the highest draw-off point.

D. MISCELLANEOUS DATA

1. Service

In addition to those environmental elements lighting, air conditioning, acoustics, etc. which are directly related to and integrated into the building design, attention must now be directed to a larger scale to include those services necessary for the above to function. Those utilities and services are:

a. Electrical power, which also serves as the primary fuel supply, will come from an electrical sub-station, located 5.5 miles from the hotel site. This power will be stepped-down through transformers to meet voltage requirements for the complex.

b. The water supply for the hotel complex can come from either the main water supply of Taipei City, in which case the cost of piping will become a critical factor, or utilize wells and draw ground water near the site. For the present it appears more feasible to resort to the latter alternative. The construction of a well and its maintenance will result in a much less expensive program than would the construction, maintenance, and operation of facilities required in the use of surface water.

c. Sewage disposal for the hotel complex will tie into the sanitary treatment plant being constructed nearby for the new housing developments. In the planning of the new treatment plant consideration was given to the possibility of a hotel in the area so that the capacity of sewage handled would not be greater than the plant's limits.

d. Police, fire protection, and the storm warning system must be determined by the municipalities concerned and accomodated accordingly.

2. Building Code and Zoning Requirement

The zoning regulations will be determined by the city of Taipei which has approved, under national government guidance, the development of the NEIHU area, which is to include a proposed resort hotel.

The project will meet all requirements set forth by the International Building Code.

3. Budget

The "uniform system of accounts for hotels" has become a standard for calculating operations costs of hotels. For calculation hotel accounting firms have set up operating ratios for every department. These are usually expressed in three different ways: (1) ratio to room sales, (2) to total sales, and (3) to cost per available room. This highly developed accounting system has led to the rule-of-thumb quote that a transient hotel under normal conditions cannot expect a satisfactory financial result unless it can obtain an average room rate of at least $1 for every $1,000 of original investment per room in the building.

If, for example, a hotel cost $10,000 per room to build, exclusive of land and furniture, under normal conditions and 70 per cent occupancy, nothing less than an average room rate of $10 could produce a satisfactory financial result.

According to a recent study by C. Vernon Kane, hotel accountant, the cost per unit of operation of the modern hotel is usually about $1,500, and payroll per unit between $600 and $750. Their operating profit before fixed charges varies from about $1,000 to $2,400 per unit, but probably none would earn more than $7-900 without their food and beverage income. A first-class resort hotel, operating year round must gross at least $3,000 per unit in room sales - or about a $12 - 14 annual average daily rate at 65 - 70 per cent occupancy.

From information studied on various hotel types in varying regions it is estimated that the cost per room figure for this hotel project will be in the neighborhood of $18,000 to $20,000 (U.S. dollar figures).

E. PRESENTATIONS

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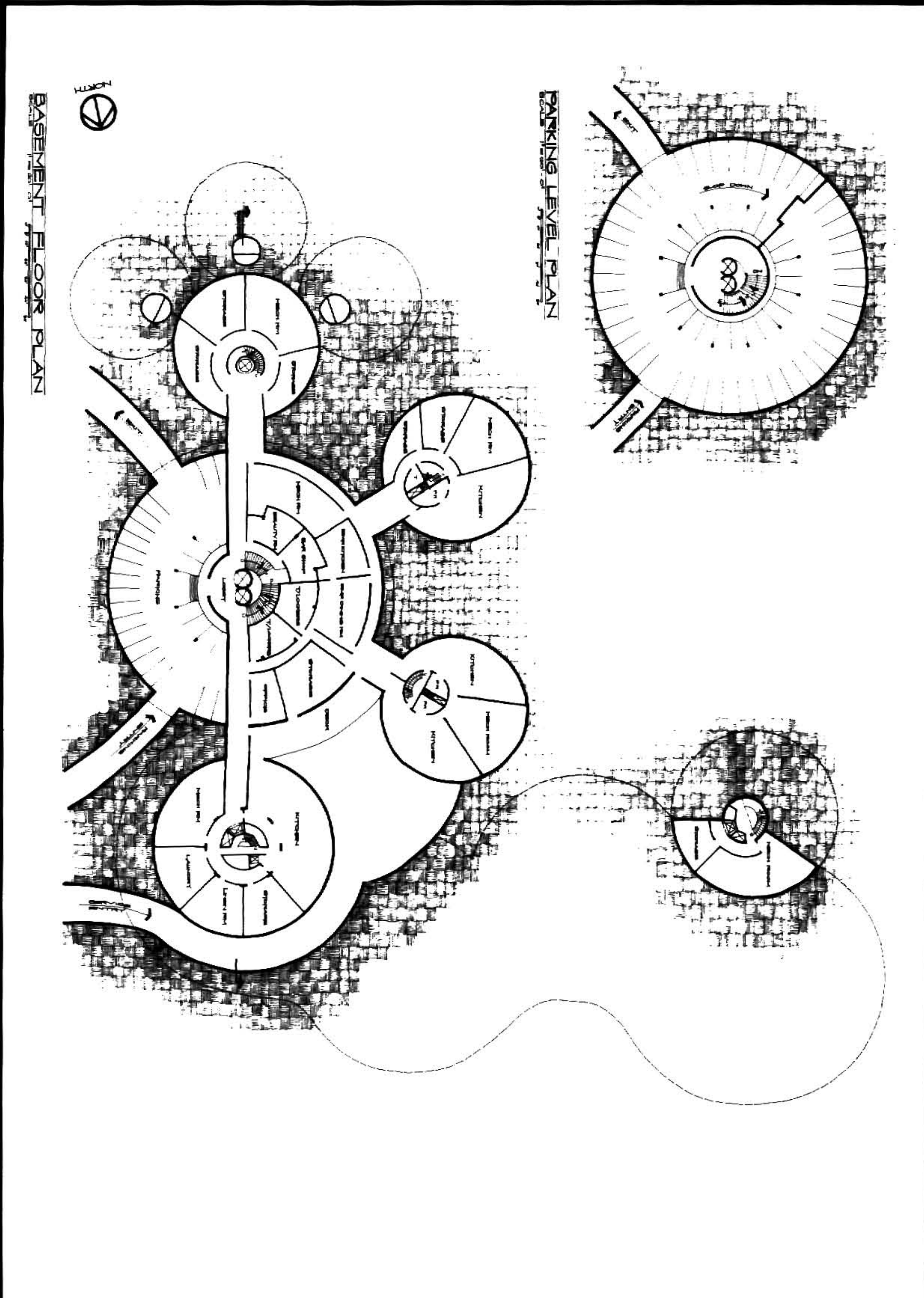

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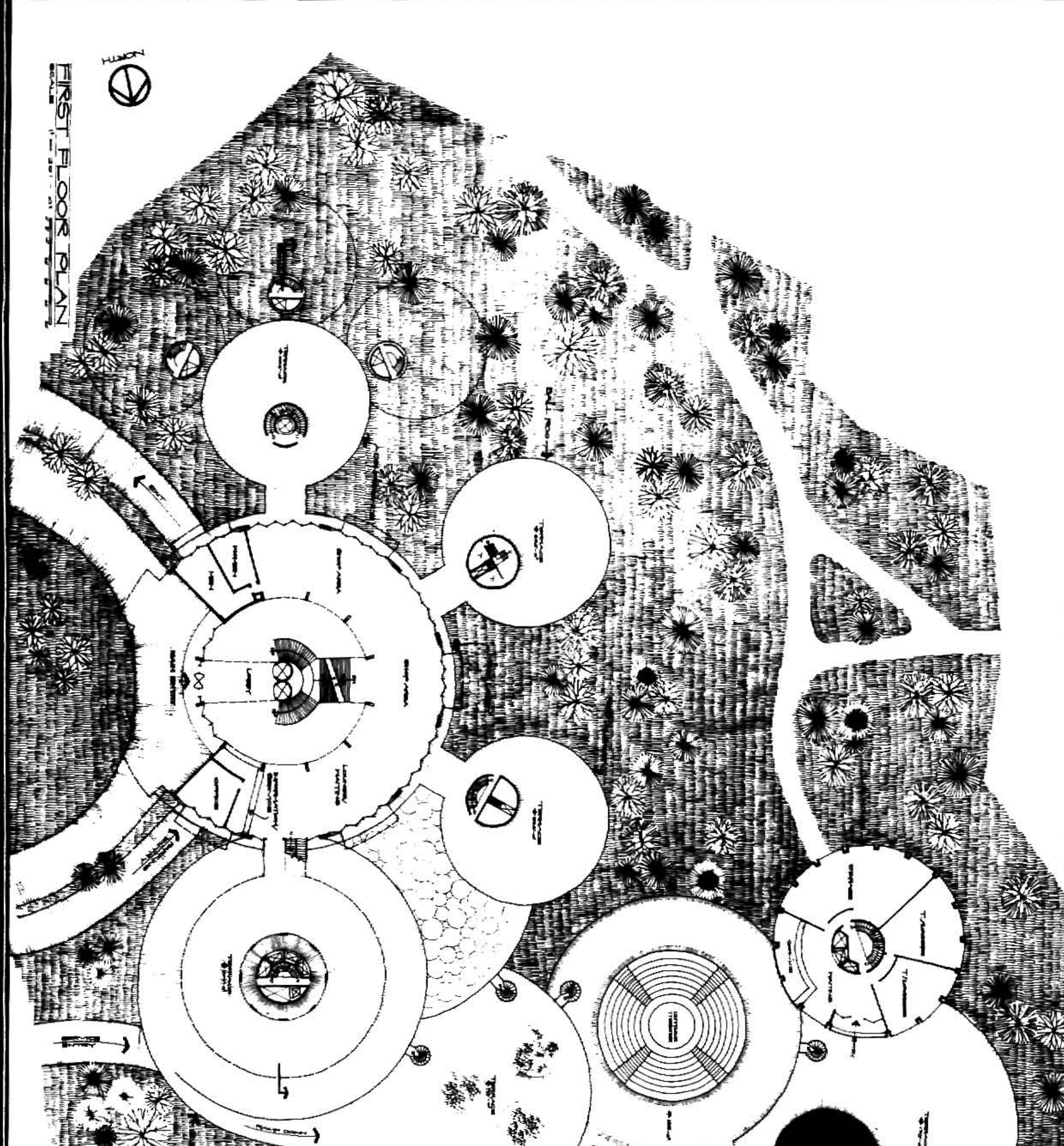

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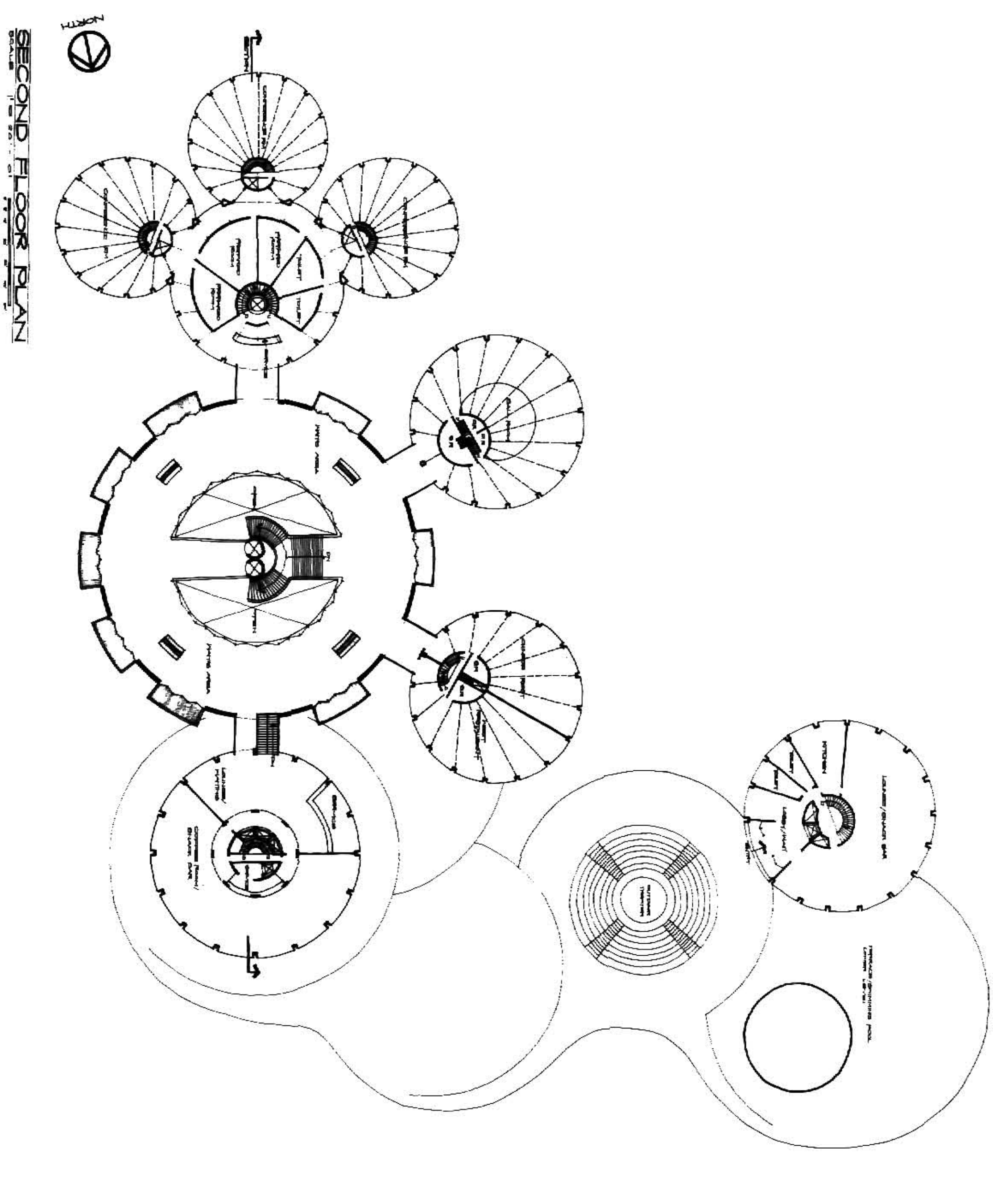

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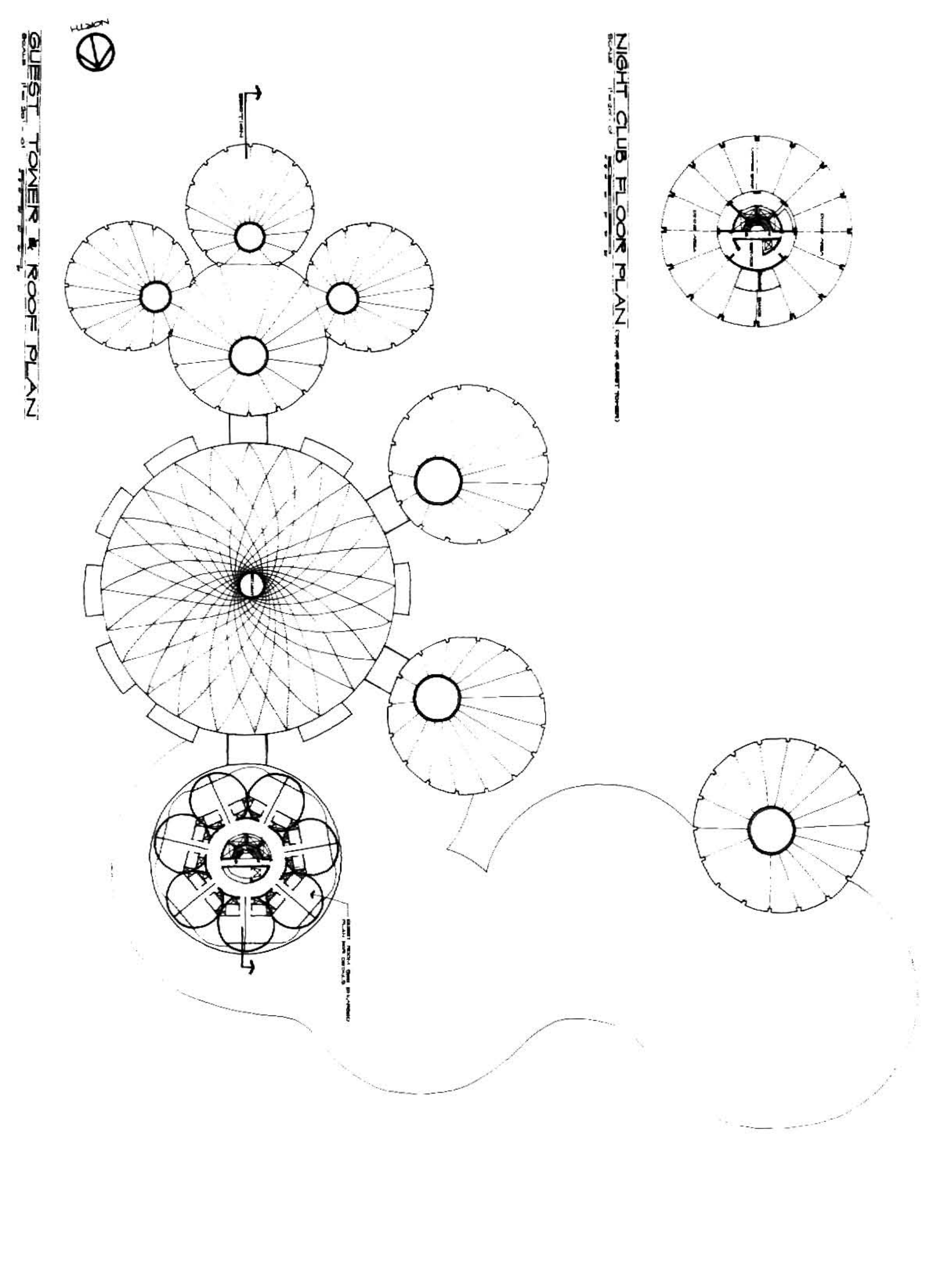

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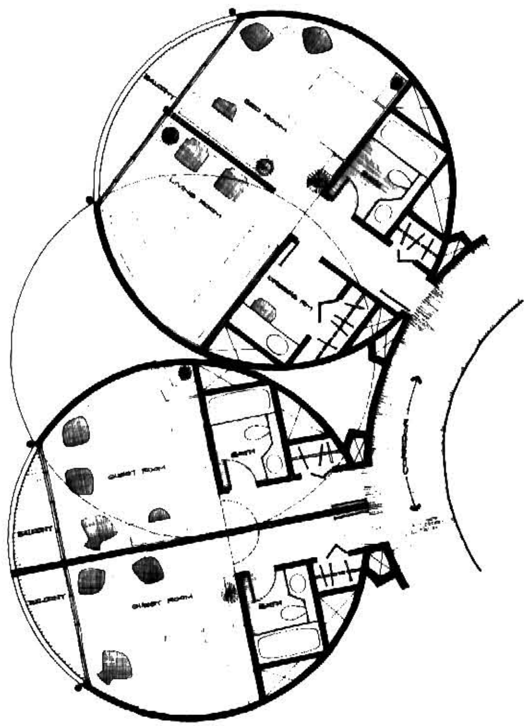
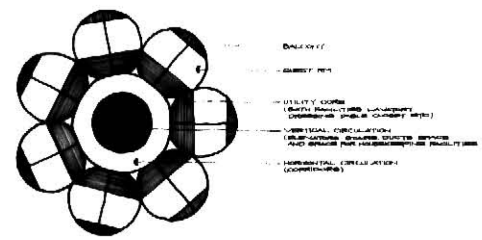
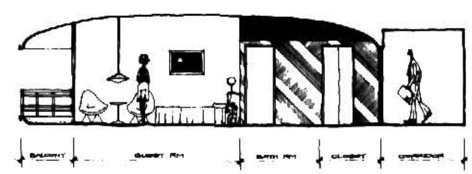


GUEST ROOM PLAN



TYPICAL ZONING PLAN



INTERIOR ELEVATION

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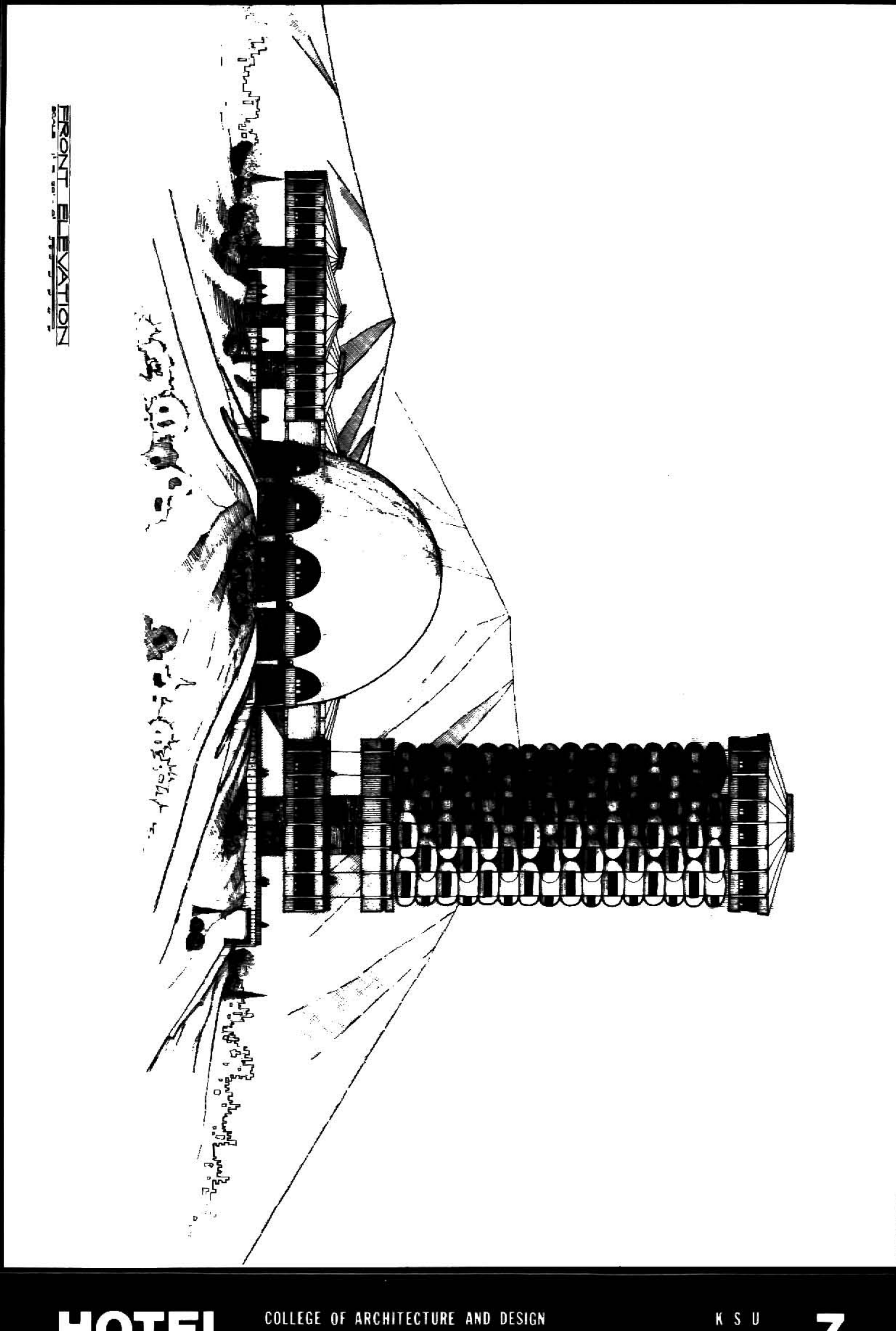

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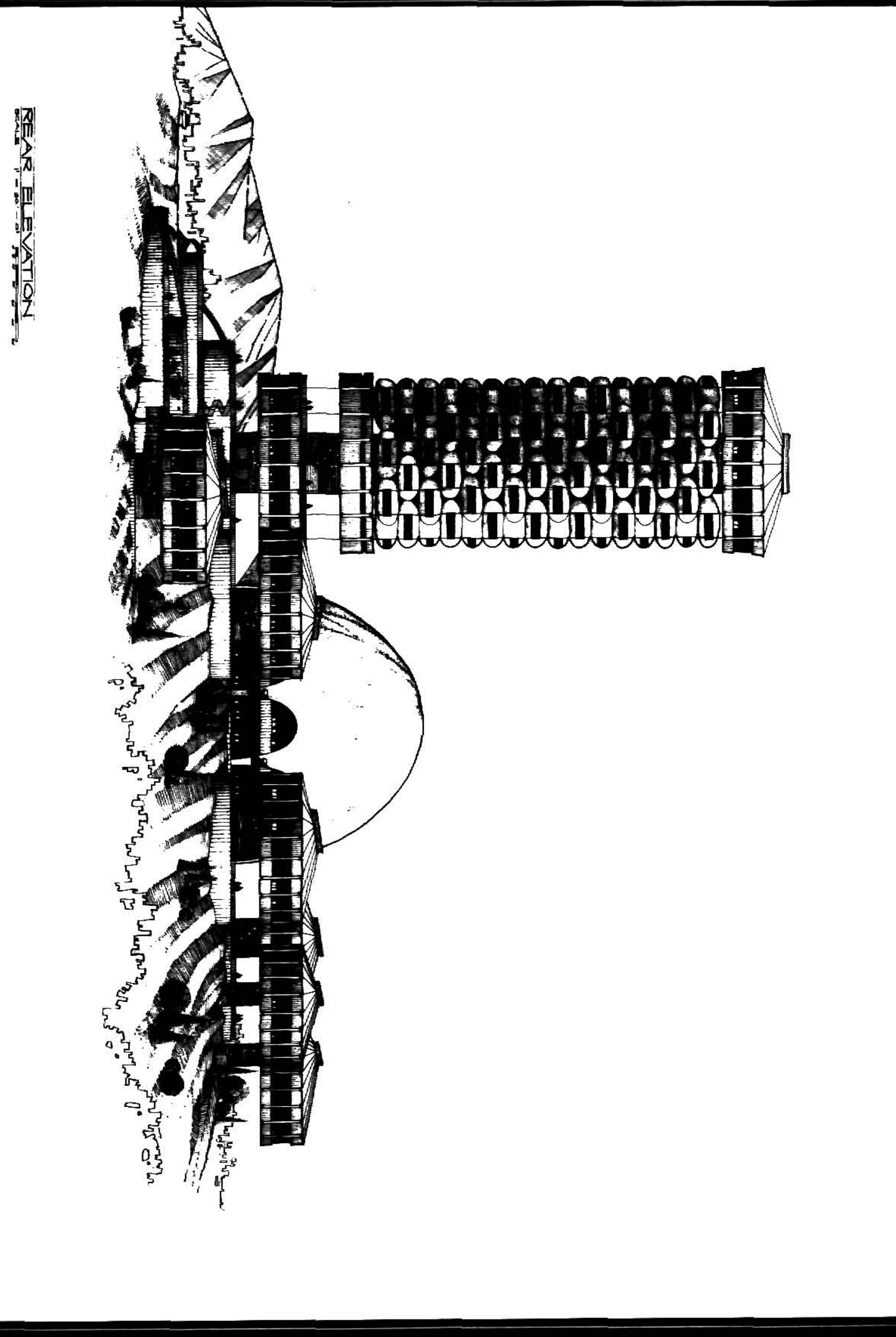

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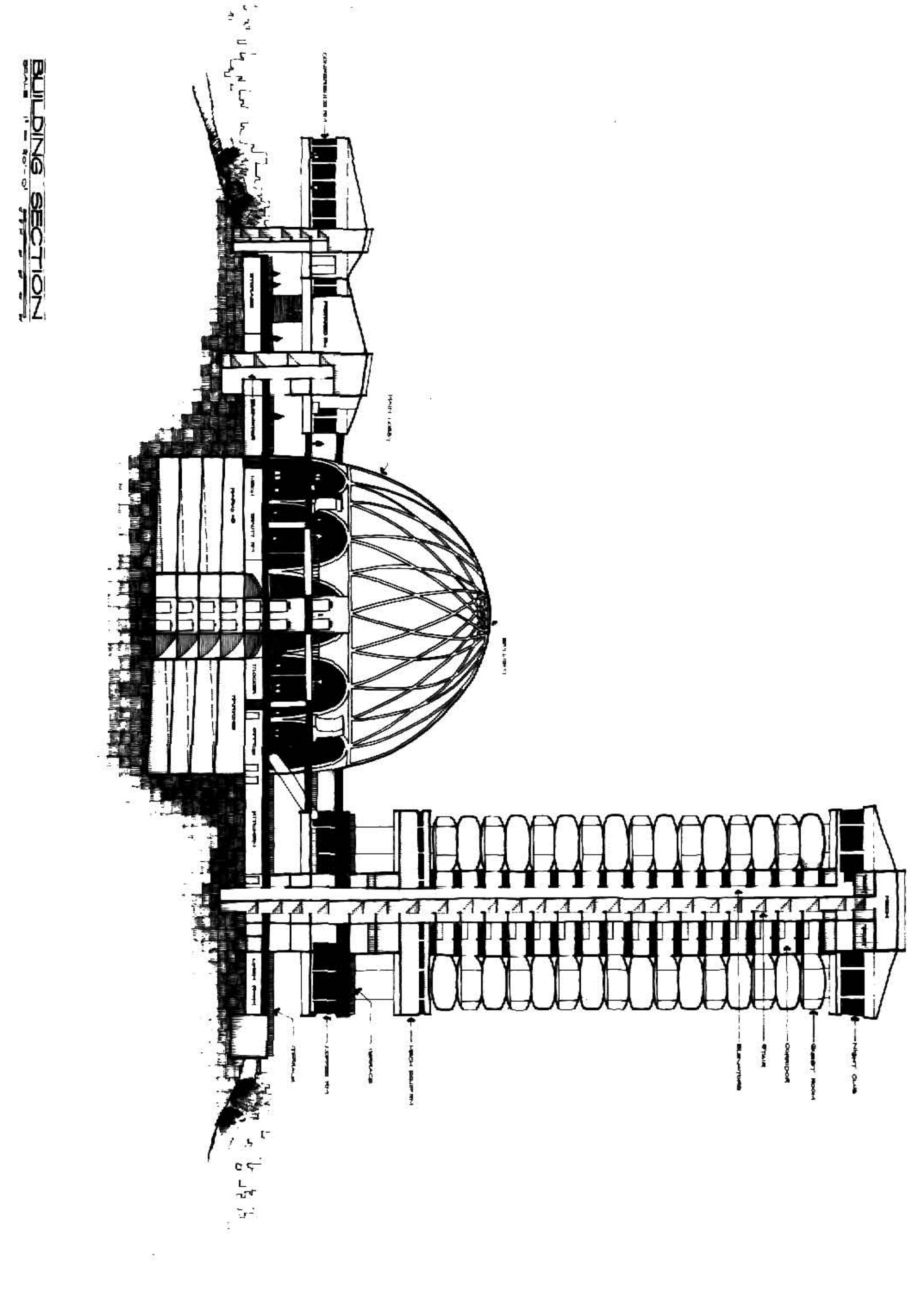

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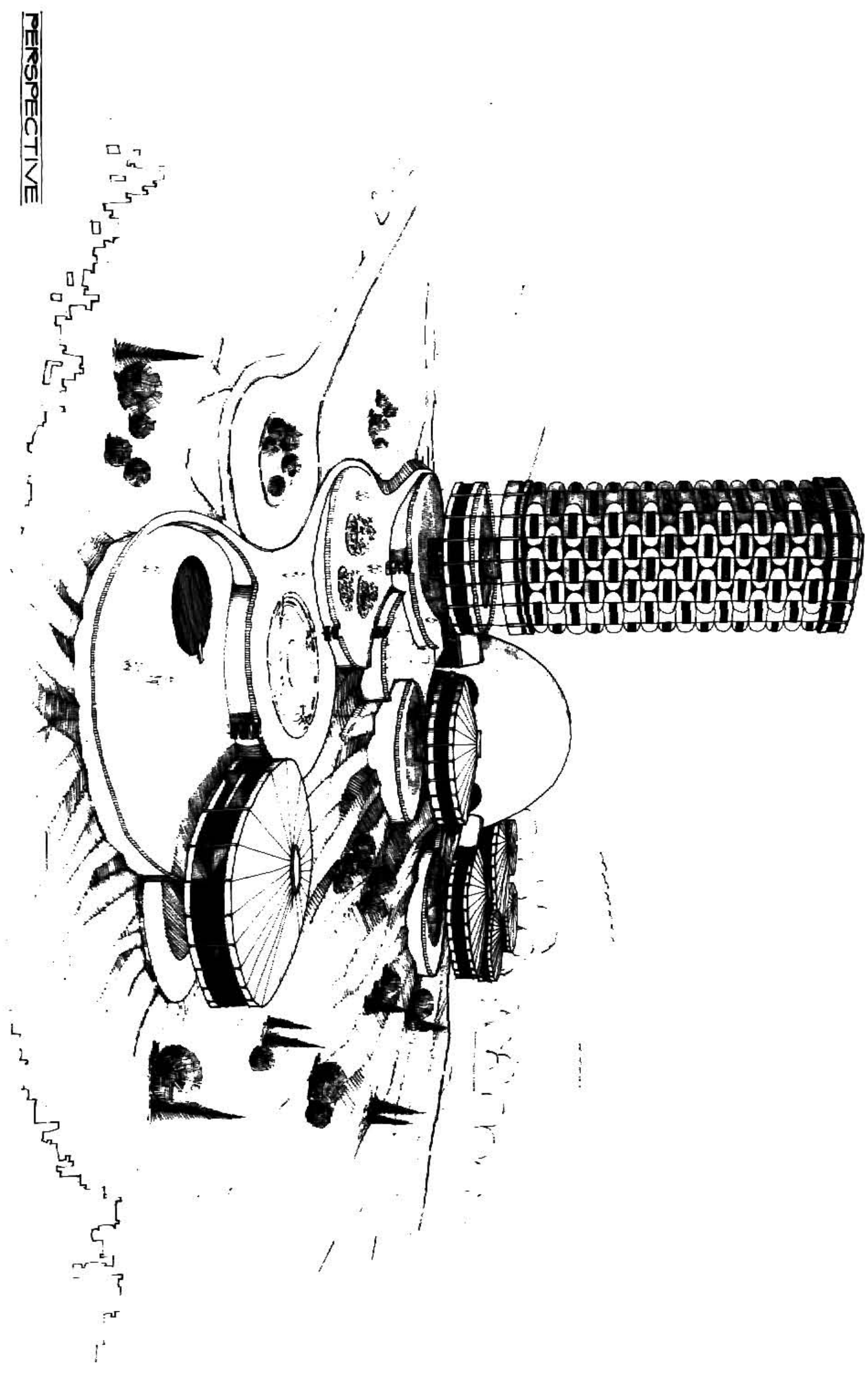

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F. CONCLUSION

It was pointed out earlier in this paper that the tourist hotel, that is sufficiently different and interesting to become talked about, advertises itself; it attracts tourists. The aim of this project has been to capture that interest and also to provide an atmosphere of contentment and leisure without making sacrifices in service and operating function.

G. ACKNOWLEDGEMENTS

The author wishes to take this opportunity to express his deepest appreciation and acknowledgements to his major advisor, professor Theodore A. Chadwick of the College of Architecture and Design and Walter Schimmel of Wichita International Hotel Consultant for their cooperation and encouragement in the supervision of this thesis.

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A CONVENTION AND TOURIST HOTEL IN TAIPEI,
TAIWAN REPUBLIC OF CHINA

by

TEH KON HU

B. Arch., Chung Kung University Taiwan China 1965

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirement for the degree

MASTER OF ARCHITECTURE

Department of Architecture and Design

KANSAS STATE UNIVERSITY

Manhattan, Kansas

1973

I. ABSTRACT

The principles governing the design of hotels - provision for food, drink, and shelter - are common throughout the world because of their relationship to the needs and habits of man. These broad principles have been established through experience and partly by tradition.

The success of a hotel, wherever located and whatever its size or standard of service is affected by the design of the building, the atmosphere which is created, the working conditions and the efficiency of the engineering services.

Working from these very basic facts a study will be made for the design of a resort hotel near the city of Taipei in the Republic of China.