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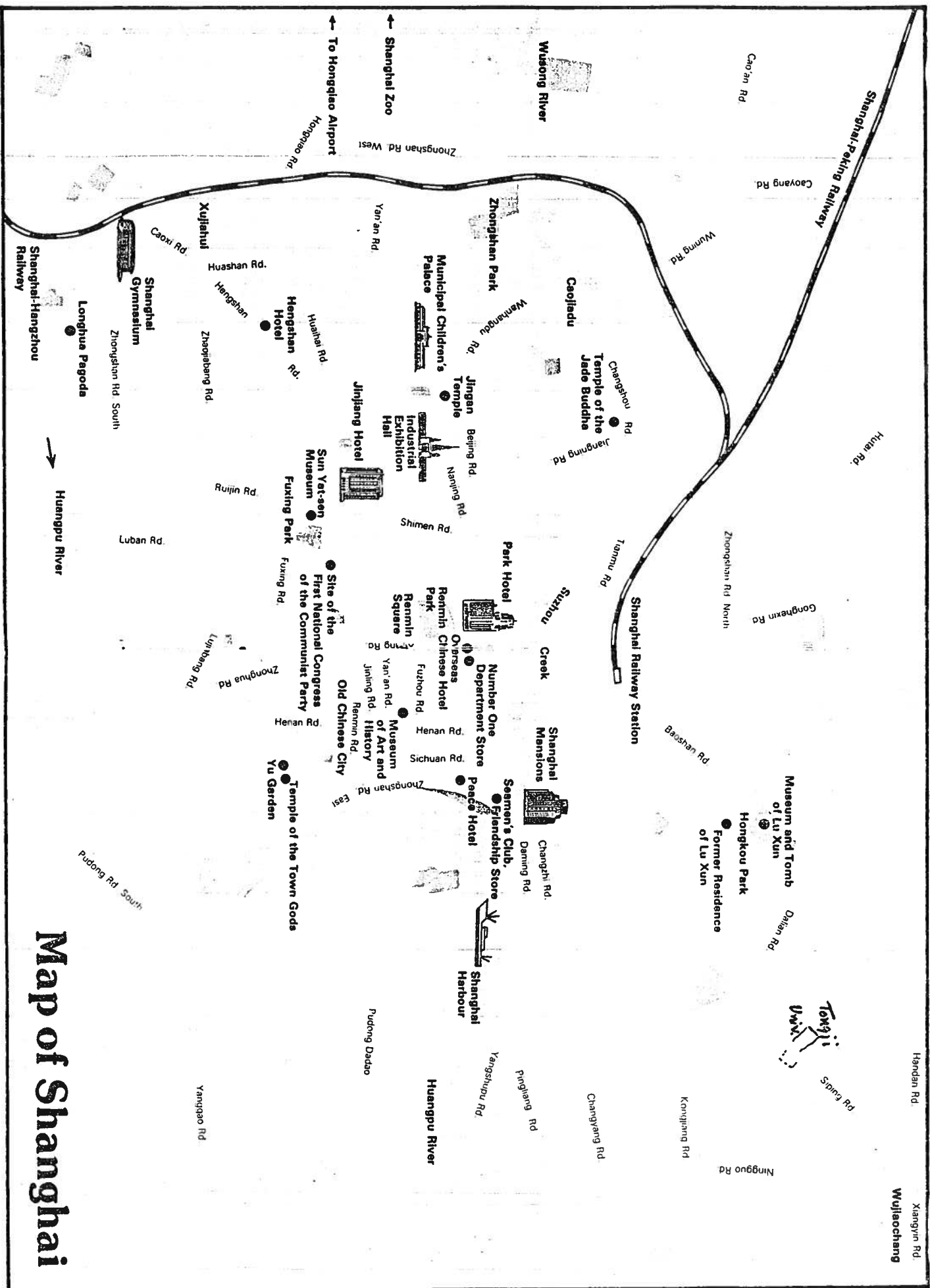
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SHANGHAI: AN INTRODUCTION TO ITS FUTURE

Richard L. Meier

After having assessed the potentials of dozens of large Asian cities, and some smaller ones, for generating development and change, it became possible to investigate Shanghai, the greatest metropolis of modern China. The future prosperity of the country depends upon this bustling, pushing, hard-edged aggregation of Chinese workers, with a reported population of 11,000,000. By far the most productive assemblage of technologies and organizations has been brought together at this locale on the estuary of the Yangtze.

I have had less than a week to see the real Shanghai, walk its streets, sense the traffic, feel the pace of the organizations, gauge the scale, mingle with its crowds, relish its cuisine, and differentiate it from the other great cities of East Asia.

The first part of this report was written before I entered China. It explains how I arrived at a body of expectations, raising some questions along the way that might be answered through direct contact. Wherever these preconceptions were changed by observations on the scene I will introduce an insert describing the reality and make some explanation, if possible, for the mistaken impression derived from the reports to the outside.

The language barrier is total and complete. Also, interpreters, when available, face a tremendous cultural gap, so speech is an inadequate

channel for me to achieve understanding. The street signs, instructions, notices, and periodicals should be even more uncommunicative, since the symbols are perhaps only one per cent romanized.

Actually the romanization is close to 5% on streets, shops, advertisements, parks, and other points of interest, but English translations are virtually non-existent. Thus I know now that shangdian means shop, but very likely a restricted class of them that I have not yet been able to infer. This simultaneous use of symbol systems is apparently left over from the time when a concentrated attempt to romanize the language was made, a program which has now been soft-pedalled.

Comprehension of the urban scene can only be achieved through the perception of order, pattern, and systematization in the ecology of the cityscape combined with translations of the media that are allowed to seep through the censorship. Experience elsewhere reveals that these kinds of information can be reconstructed into a whole that allows one to formulate expectations for future change in design, facilities, and pace of development. What it misses altogether are the party intrigues and the political byplay conducted behind closed doors. The Overseas Chinese can tune into the chain of whispered confidences and rumors of administrative shakeups--it involves them almost to the exclusion of almost anything else--but I cannot make sense of that dimension.

Fortunately there was time and opportunity to collect virtually all the recent English language information on Shanghai and other cities of China. For present day Shanghai the publications are astonishingly thin, since both the Hong Kong University Library and the Centre for Asian

Studies drew a blank. The bookstores had a small 80 page Guide to Shanghai, done by the editors contributing to the Far East Economic Review, but about half of it is color photography. The only contemporary map I could find in English came from there (Fig. 1). The best source of information is the new English language China Daily, published five days a week simultaneously in Beijing and in Hong Kong. Its quality is comparable to the Korea Herald and Times, and the Yomiuri Shimbun in Japan, but not up to the standard set by the Japan Times.

It has been possible to meet a few Overseas Chinese trained to analyze cities. They frequently reveal the gaps in the reporting, misleading features of the statistics, and some nuances that might otherwise be missed. So I became an eight week China watcher. The only experience of sights and smells to be associated with the reports collected prior to the visit had been obtained from the other China that is found on Taiwan. However in Taipei and Tainan we found ourselves assailed by evidences of new, undigested wealth (in the form of private cars, motorcycles, freeways, luxury apartments, and touristic promotion), even while buying from hawkers and eating at street stalls until late at night, to mention simple opportunities that cannot be allowed as yet on the Mainland.

ECONOMIC FUNCTIONS

The People's Bank of China (Shanghai Branch) in 1980 created an information network for reporting upon economic activities. Collecting information from 264 major enterprises covering 145 categories of products, as well as conducting the standard surveys of consumption and small scale production, Shanghai appears to have more systematic data than other cities.

Therefore the occasional item that is released is likely to be more carefully edited and justified than elsewhere in China. To rationalize the lending, the bank branch has centralized data on product structure, output, management, and forecasts. Especial care seems to be given to the following industries: paper, plastics, rubber, dyestuffs, and glass. (Is the order significant in this case, as it would be in other lists? Various items in the press suggest that it could have been a priority ranking for 1981.) The branch bank also publishes two periodicals, apparently for all China.

The China Daily (10/1/82) reports Shanghai's economic performance for 1981 as follows:

Industrial Output	64,680 million yuan	(US\$ 36 billion)	up 3.2%
Industrial Revenues	17,155 million yuan		up 3.1%
Manufactures Shipped	11,350 million yuan		up 6.3%
Commodities Shipped	8,500 million yuan		up 14.9%
Retail Sales	9,500 million yuan		up 8.8%

How are these terms defined? Or the aggregates estimated? No explanation is offered. "Industrial Output" must involve a great deal of double counting, because on an annual per capita basis it comes to US\$ 3200. This is more than eleven times the level of gross domestic product per capita for all of China, as reported in the Asia 1982 Yearbook put out by the Far East Economic Review (see errata). It is probably most nearly equivalent to turnover, but it must be remembered that the ratio of net product to turnover will be greater than in Western countries because the firms are much more vertically integrated in China.

On the basis of all reports Shanghai must be by far the most productive metropolis in China. It must be returning quite large sums to the central government, because the pay scales for equivalent levels of skill are the same as elsewhere, and the bonuses are modest (as compared to other places in Asia), thus leaving a substantial surplus.

According to figures published upon leaving Shanghai, its industrial output accounts for 13.8% of all of China. Again the figure of more than eleven fold enhancement of per capita productivity appears. From evidence to date the GDP/capita/year for Shanghai in 1981 should fall into the US\$ 700-900 range.

After being there I will correct the above figure; it most nearly approximates the consumption level at Shanghai prices. The sizable surplus transmitted to the Center should raise the GDP figure considerably. Since the farmers delivering their vegetables, meat, and eggs now have a productivity approaching that of factory workers, and pass on much less of their profits, they are for the first time much better off than the townsmen.

This is to be compared with about \$2500 for Seoul and Taipei, \$4600 for Hong Kong and \$4850 for Singapore. (The largest source of uncertainty in these figures arises from the need to establish a standard American dollar, since it became 15% harder with respect to East Asian currencies over the course of the year.)

This discussion leads up to the question about the reality of the growth rate reported for 1981. For all of China the economists of Hong Kong's Centre of Asian Studies report that the official GNP figure (up 3%)

was revised by the United Nations very recently to 1.7% after making more realistic adjustments for inflation. Is Shanghai a pace-setter for inflation? If so, that should become apparent in the free markets that flourish there. In any case, we outsiders looking inside are warned that the optimism reflected in official reports (and those of most China-watchers working in Hong Kong, as well) needs to be very substantially discounted.

The free markets of Shanghai were mostly morning markets, and therefore food-oriented. Hawkers were exceedingly few and far between; eggs comprised one of the major commodities sold on the street--mostly fresh, but pickled and cured varieties were popular in the older parts of the city. In the last year or so the extra supplies generated by household scale production have brought prices down to the point that they are comparable with the official markets. The difference is judged to be a proper premium for freshness and quality. Because my guesthouse breakfast was rigidly scheduled at the most appropriate time to make a survey, I have had to depend upon the reports of bi-linguals. A real surprise was the discovery that prices are shown much more often in arabic numerals in Canton and Shanghai than in Hong Kong.

A complicating factor in interpreting metropolitan economic changes is the shifting impact of the subsidies applied in the internal system of accounts. Until recently China tried to maintain constant prices, but this policy cut seriously into the revenues from State enterprises passed onto the central government (FEER, 12/3/82). For example, because 71% of these subsidies are for grain, cotton, and edible oils, Shanghai would benefit

more than elsewhere.

Special coupons are required for these commodities. A German economist obtained the necessary coupons from his consulate and went through the purchase process for a cotton shirt. He discovered that people did not feel any shortage of cloth because synthetics were free of coupons, although much higher priced. The synthetic fabrics are greatly appreciated because they are much easier to keep clean. Although the Shanghai cuisine is the oiliest of all Chinese cuisines, no complaints were heard about cooking oil shortages, and the same was true of rice.

Fuel oil charges remain reduced 17% below world price with the aid of subsidies, coal 46-86%, diesel oil 87%, and industrial electric power 76%. Petrol, kerosene, and household electricity are practically free. This price structure goes a long way toward explaining the low economic output per unit of energy in China. It also accounts for a reduction in the "profits" of state-owned enterprise in 1981; the shortage in funds is reflected in a reduction of planned physical growth for Beijing some months earlier than the rumors of the decision to reduce the size of the top bureaucracy.

Engineers and architects in Shanghai report that they are not allowed to build into their designs any domestic use of petrol and kerosene, and the present level of use in the Shanghai region is trivial. Thus the subsidies represent intergovernmental transfers, especially to the rural communes.

An added peculiarity is the internal rate of exchange for hard currency. The Central Government credits itself 71% of the value of the

imports and rewards exporters with 71% of the sales. Thus the yuan has a value in the internal accounting of \$0.55 for some purposes, and for others \$0.32.

Energy utilization is a somewhat less ephemeral indicator than profits or prices. The consumption of coal in Shanghai was 17 million tons, and the total energy consumed in coal equivalents was down 0.1% in 1981. In this connection the Shanghai industrial output was said to be up 3.4% (recall that the economists had reported it to be 3.2%). The increased efficiency is attributed to the energy conservation program. Over the year the thermal efficiency of 636 enterprises was assessed, with about half falling in the range of 25-35%, some were better and reached as high as 45%, and quite a few dropped below 25%. The figure probably refers to the thermodynamic work obtained plus the amount of energy incorporated in the products sold, as in plastics. Fifty two sites were shut down last year for waste of valuable energy.

The majority of chimneys of the factories still released nauseous grey-to-black smoke, which indicates poor efficiency in the combustion of coal. There is still much room for economizing on fuel use. More recently (CD 6/23) a new kind of boiler has been installed which allows Shanghai to consume "bone coal", which has a high moisture content.

The plan for 1982 is to obtain 4% more output from the same energy input into Shanghai, thus saving a theoretical 380,000 tons of coal, 60,000 tons of oil, and 200,000,000 kwh of electricity, which is about 70-80% of the conservation achieved in 1981, indicating that the planners believed that many of the most obvious actions had already been taken. The current

plan does not appear to be very ambitious as compared to 8-10% improvements in energy efficiency per year occurring simultaneously in the capitalist metropolises surrounding Shanghai. The chief constraint is reported to be the overload of the electric power grid which causes voltage reduction and a fuel requirement per kilowatt believed to be 20% higher than for optimal working.

Observations seem to contradict this claim. No flickering of lights could be observed in northeast Shanghai in a district surrounded by industry. However this test does not work very well for daytime hours.

Rail transport capacity limits the delivery of added coal, and petroleum production is on a plateau, so Shanghai is forced to reorganize to meet these medium term plans. Producing consumer goods is a partial answer; more than 400 factories have shifted over the past two years. Plans for 200 more products have been prepared, from which 100 will be selected.

This strategy has begun to produce magnificent results in the first quarter of 1982. The estimated value of industrial output for light manufactures rose to 52% of the total by making a jump of 35.7% over the equivalent quarter last year. As hoped, the presence of goods in shops provided the incentive to produce more coal, cement, and heavy industrial output in general in "cash terms" by 8.5%. On the same basis light industry was up 14.6%. This sharp upswing continued at least until July, 1982. As one might expect, the additions to light enhance turnover much more than net additions to output. These figures are for China as a

whole.

Only a few mentions have appeared regarding the kinds of light industry being encouraged. A plant for the production of television sets went into production last year in Shanghai; its capacity is 4,000,000 black and white 12 inch sets per year, and it depends almost entirely upon Chinese materials. In 1982 it is planned to diversify into 9 inch and 25 inch screens.

The latest reports claim that 1.37 million sets were produced in all China in the first quarter of 1982, which is more than were produced for the whole of last year. Evidently that plant is now in full production.

In 1981 Shanghai manufactured 33% of all the watches in China (the total in use is now 150,000,000) including some for export, but inability to keep up with the rapid design changes affecting a saturated world market prevents expansion of future exports.

Shanghai spins and weaves enough cloth to fill the effective demand of 200,000,000 Chinese, specializing in cottons and in new designs for more fashionable goods. The gross value was 17,000 million yuan (almost US\$ 10 billion), of which at least 10% is exported. Output in 1981 was up 17% in China as a whole. A large share of the raw cotton is imported, so exports are needed for balanced trade. The principal limitation shows up in dyestuffs and chemicals; both of these industries are concentrated in Shanghai. Textiles use 36% of all output from the 6000 enterprises in the chemical industry. The stated policy is to re-equip Shanghai for the world market, including the manufacture of more dyes and special chemicals.

Although the quality of Shanghai's light manufactures has a good reputation within China, it wins very few prizes. When 105 industrial products (almost all light manufactures) that were made in more than one city were judged for quality, Shanghai's score came out fourth. Nantong, a city of 370,000 on the north side of the estuary was rated the leader.

Coincident with the push for light manufacturing is the encouragement of services, which had been neglected earlier for ideological reasons. A high level of unemployment among the youth has been a strong reason for organizing co-operatives, about 2000 of which have hired about 20,000 in the past two years in Shanghai.

The exemplar is a new store next to People's Square, where the pedestrian flow approximates 100,000 per day. Secondary school graduates are employed; more than 200 applied for 130 openings. Each was expected to invest 100 yuan (about a quarter of a family's monthly expenditure rate). The remainder of the capital takes the form of interest free loans intended to expedite co-ops. The management of the enterprise is trained by retired workers.

The new co-op opens two hours earlier than the standard shops; it has fresh buns ready and fruit direct from the morning market. It serves fried cakes and soups, particularly welcome in cold weather, snacks, and general merchandise. The wages of the workers depend upon the amount of business and the monthly assessment of the quality of work. If there is a surplus a semi-yearly bonus is declared.

Some of the co-ops are set up to improve yields in the production of vegetables. Due to new construction at the periphery Shanghai vegetable

plots have shrunk to 12,470 ha. Other farmland (rice fields?), totalling about 20,000 ha., has been shifted to vegetable production, but the yield is only a third as great. Shanghai's vegetable consumption is 211 kg/cap/yr (almost 50% greater than the U.S.). More storage cellars for roots and tubers and greenhouses are needed. The food producing enterprises got together to create a trade association in 1982 with 600 member units (CD, 20/6/82).

TRANSPORT AND COMMUNICATION

In China half of the inter-city passenger movement (900,000,000 trips per year) is by rail, which also carries 72% of the freight. Shanghai is connected into the major double track system that goes through Beijing to Harbin, but also comes back to Wuhan with its famous bridge over the Yangtze. The principal bottleneck is the single track railway that predominates. A source of inefficiency in energy use is the dependence upon steam engines (only 20% of the trains are hauled by diesel or electric power).

The total goods transport in China amounted to 1134 million tons in 1981, up 13.8%; the passenger movement was estimated at 2800 million trips. Aquatic modes, barges, coastal shipping, and ferry, accounted for 10% of the freight and 1% of the passengers. Shanghai has just installed new ferry piers capable of adding 20% to the national totals for marine passengers. It is also renovating wharves and adding to container-handling facilities. It started a passenger liner to Fuzhou in 1982, and another to Amoy begins next year.

The total vehicle population in China is reported at 1.79 million, of which 1.3 million are trucks and vans. The most popular of these is the mianbaoche (bread vehicle) manufactured by Mitsubishi and Mazda. Note that the Mainland produces about 100,000 vehicles per year (this figure probably includes motorcycles, but not mo-peds). In comparison, Taiwan with only 2% of the population of China, manufactured 120,000 4-wheelers of all kinds, 160,000 motorcycles, and almost as many mo-peds.

The traffic in Shanghai is made up mainly of trucks, buses, and bicycles. The peak hours are 6:30 to 8:30 AM, with lesser congestion in the afternoon at 4:00 to 7:00 PM. The amount of delay due to congestion is remarkably small for a large city. I would estimate that the flow could be raised 50% after making minor adjustments to intersections.

The telephone system in China is admitted to be a "weak link." However, Shanghai will share with Beijing, Canton, and Tianjin 1000 new long distance circuits and 170,000 new telephones before 1985. New computer exchanges are to be used. Last year the revenue from international communications was up 56% signifying the pace at which China is opening up.

CONSTRUCTION

The mayor of Shanghai, Wang Daohan, invited the architect-president of Tongji University to review urban development over the next ten years. The priorities are (1) industrial growth, (2) birth control, (3) housing, and (4) environmental hygiene. At least four satellite cities will be developed, super-imposed upon the existing towns of Pudong, Minhang, Jinshan, and Jiading, at a density of 38,000 persons per square kilometer.

Tongji will start a consulting service to improve the urban environment.

At Tongji no one had heard about a new consulting service; of course, many of the faculty are already so involved. The satellite city program is not new--it was started as a proposal in the 1940s, based upon discussions at Harvard of British post-war plans. The proposals have been dusted off several times since then, but nothing happened. Comment was made by the planners that city and satellite will have grown together before the program is implemented.

Some rather interesting policies are being considered for dealing with the housing shortage in Shanghai. Rent will be based upon the number of persons in the household, with one-child families assigned significant preference. Four yuan per month will be charged for each ten square meters of extra floor space (a 40-50% increase over typical rent). Warehouses and workshops will be converted to residences. Migration to suburbs will be encouraged by moving offices out to them and offering lower rents. Because marriages have been delayed for years for lack of a private room or apartment, it is hoped to provide furnished apartments in the city for short periods. Space can be saved by building dormitories for youths.

These policies must not yet be in operation, because crowding was often mentioned in our discussions, but none of these measures were elaborated.

Private housing is being encouraged through the state lottery. Interest on bonds is entered into a lottery, and prizes are of a size that allows building a 50 m² house or buying into a co-op apartment. Apparently

private arrangements (backdoor dealings) are common, but they are to be "stopped."

Shanghai is not included among the 24 cities designated to be improved for the "promotion of tourism and the creation of socialist civilization." This program includes the preservation of traditional architecture and old trees. The Shanghai public does not seem to look backward; it is, for example, the home of chemist Ye Yonglie, who converted his lectures into a movie entitled "A Journalist Travels into the Future," the most popular of a new school of science fiction films.

Architects at Tongji believed it was likely that a program for the preservation of old houses would soon be instituted. I saw some very active work proceeding on the restoration of an old temple complex on the west side of the inner city, and some of the Old Shanghai housing was being repaired by a team of artisans, but these were working according to a previously announced policy. Preservation seems to be a major concern of the intellectuals ("guard old relics" is a major theme); they would be quite willing to live in these museum pieces.

Part Two

MY JOURNAL FOR THE APRIL 2-10 VISIT

THE GATEWAY: GUANGZHOU (CANTON)

The airport is like those for similar cities in India (Madras, Bangalore), but the colors are not faded and dismal. It receives only 150

passengers at a time and perhaps no more than a dozen loads per day. I experienced no fighting for taxis, almost everyone had an escort waiting for them with a microbus.

Tung Fang Hotel is a hostelry coming of age. It had been something like the Mandarin Hotel of Taipei without the garishness, but now it has tripled in size. When the bottom floor is finished, it will endeavor to become a metropolitan hotel, putting on functions for the elite of the local community. It now has air conditioning, TV, full carpets, and some taxis (mostly Japanese vehicles 5-15 years of age). The styling of the arts and crafts shops in the hotel reveals arrested evolution about fifty years back, and the wares range from ordinary to crude. The "coffee shop" serves soup and noodles (spring rolls for breakfast only). Walls are bare of pictures, now that Mao's portraits have come down.

The big dining rooms are on the eighth and ninth floors. They exhibit a busy chaos that results in quite long waits. Tea was luke warm and the first dish cold, but the shredded chicken and the tofu soup were reasonably warm. Most of the service help has mastered the English they need.

The price I have just learned from the telephone, is 45 yuan (US\$ 25). A modest dinner was US\$ 5.00. This is about the same as in Taipei, but there is no 10% service charge in Canton.

The city water (it could come from an onsite well) comes out of the tap milky; the fine bubbles soon clear, but later leave a brown deposit. This proves that they are not using unfiltered Pearl River, because riverine colloidal brown would take days to clarify. The residue probably explains the grit in the noodles I had at lunch.

Walked down to the river and back (5-6 km total) along an avenue that supported a trolley bus line. The most striking feature was the lack of ecological specialization. The road was lined with shophouses, with people living in some of the original shops, and openings from courts and alleys that feed into it. All seem to be well drained, since their exploration was undertaken in the final drizzle of a strong thundershower, but flow was aided by a knoll immediately to the east which had been cut away, leaving the top wooded for some kind of park. Occasionally there would be two bicycle repair shops next to each other, or two shoe shops, but then a bake shop, fuel briquette store, or a dry groceries emporium would be adjacent.

Six small and two medium size cinemas were scattered along the route. One sizable complex with a restaurant, grocery, and bakery carried a large sign: Hong Kong Food. Beside a scientific instruments firm with its back to the river was a department store. According to the schematic map in the Guide this was adjacent to Haizhu Square, and the road I had followed was Jiefang Lu. Curiously, the west side of this road was maintained at a higher level (i.e., more whitewash on the plaster, better quality brick and tile, some carved doors and windows, and more ambitious shops.) Had they widened the street some decades back by cutting back the shophouses on the east side?

Rush hour at six o'clock brought with it a stream of bicycles. Woks of stew were being consumed at rickety tables on the sidewalk, or while squatting near the 12-opening cooking stove burning briquettes. School children wandered along the sidewalk on their way home. Streams of bicycles carried vegetables and small packets of meat for the evening meal.

This roadside showed very few signs of new construction. There were evidences on the walls, however, that Zhongshan road had been widened by shearing off Jiefang's row of shophouses. A few sites cleared in the past decade had been filled with five story apartment buildings. Quite a bit of renovation work had been undertaken in the past few years, but it did not try to be ambitious. Plaster here gets brown-splotched with age, rather than mildewed, as in other places with similar climate. (Probably due to leaching from the bricks behind.)

At dawn I took off for the east along a pleasant tree-lined avenue outside the fence that surrounds Liuhia Park. Many new six-story apartment buildings are going up there and a huge storm sewer is being laid. Vegetable plots are being invaded for the purpose.

I came to the railroad and walked beside it. The freight cars are US-sized and the shunting engines are large diesels. Piles of coal and cinders lay in the switching yard, indicating that steam is still in use here. The rail workers seem to live in poorer housing where the lanes remain unpaved, but this may be due to a doubling of the size of the colony. The latest buildings use a reinforced concrete frame with a low grade brick infill which will probably be plastered later.

This excursion brought me to Huansi Road and the string of public buildings that precedes the railway station (identified by the clock in the center front and the bus terminals in the yard). The roads coming away from the station are lined with billboards advertising various industrial products.

This kind of urban ecology is commonly found in the Third World.

Almost all of the posters have romanized sub-titles so that, for instance, some garments are made from spun rayon textiles, and many machine tools are licensed from Bosch.

I met an American of about sixty years with a white-haired wife, who wore everywhere an engine-drivers cap with insignia on it labeled The Furrow. He was the representative in Beijing for John Deere and Company, the agricultural machinery firm. He mostly served as a missionary for modern agriculture and could compare the relatively affluent conditions in Guangzhou (affected by strong contacts with California, since the predominant share of its Chinese immigrants came from the vicinity and often returned for visits). He could describe vividly the grinding poverty of the more distant communes.

SHANGHAI

The passenger terminal at the airport was built in 1960, so inbound passengers have been pushed out to a small shed. The parking lot contained about fifty cars, microbuses, and a few small buses. The V.I.P. road from the airport (Yan'an) contained no advertising or exhibitionism. Fields of green vegetables, some crops buried in windows of straw covered with plastic sheet, a few greenhouses, pleasant cottages, and vigorous trees not yet budding in this late gloomy spring. The real spring turned on while I was there.

Tongji University is on the opposite side of the city from the airport. Occasional neon signs in the central area showed up strongly because street lights had been snuffed out, and the swivel-hipped trolley buses zinged along with dim yellow orbs.

The following morning revealed a city in the making. The loudspeaker blared the standard music for morning exercises of the production brigades. Tongji has its own "village" of several thousand faculty and staff households; the guesthouse I was brought to is one of the newest additions. Being a gwei-lo community, it had its own wall inside the wall of the university community, complete with landscaping to establish its status. Residents were more than 90% Germans. Tongji had originally been established by Germans, and German language was once the medium of technical instruction. They left at the time of the Japanese invasion, but the blond children playing in the courtyard were indications of return in force.

Trolleybus #55 terminates just short of the Tongji gate. Diesel buses with the same number continue to the northeast. Therefore this area has one kind of an end-of-the-line cityscape. An inspection tour suggested that a secondary school and military school came out to settle in the vegetable fields forty to fifty years ago, judging by the architecture. They were followed by factories which were set up in the same district. The factories expanded in good times, changed product as politics shifted, and survived hard times while anchored to a site--the workers living in the vicinity kept them from dissolving. Growth industries, such as electrical equipment and chemicals spawned new production facilities on the vegetable patches, seeming always to choose slightly higher ground. The roads improved, the drains were covered, and the utility lines were extended. Village type houses were built one-to-two-stories in height. Sheds were made available for unmarried temporary workers' housing. The newer plants had a graver problem; they had to provide adequate housing in order to keep absenteeism under control.

The four story walkup apartments tied to the manufacturing and educational establishments are perhaps 8-15 years old, the five-story about 3-8, and six-story predominates among the most recent--each tract added making a new dent in the vegetable acreage. As a result the cauliflower now harvested rarely reaches the local official markets; the pile on the road's edge disappears into the shopping bags of passing women, and worker husbands on cycles returning from wherever they had been on a Sunday.

From where I sit I can see at least ten of the unique gantry cranes used to drop prestressed components into place. Their thirty meter matchstick towers (pylons?) rear back their necks to provide a fulcrum for the arm; the pulley cables go overhead before they stretch to the end of the arm and then descend. I still cannot see how they can pivot to take care of the other structures rising within their span.

The big difference between this pattern of settlement and Chinese urbanism in a capitalist environment is that there are extraordinarily few shops, and no hawkers operating out of trucks and handcarts. The result is a mosaic of brick red, stucco grey, and green fields. The reek of coal smoke, and the bite of sulfur oxides can be detected in most places, while the thump-clang of a forge can be heard with different degrees of intensity. British and American planners would be horrified to see this intermixture of industrial, residential, and agricultural land uses, but here on the edge of the metropolis it can be made to work better than Western zoning regulations as soon as the efficiency of combustion in the furnaces is improved--at least for this range of productivity.

NANKING ROAD

Behind the long line of graying stone fronts for mercantile capitalism that face the harbor is a more eclectic assemblage that facilitated the commercial connections with the interior of China. Each of these buildings represented long dead ambitions of the compradors. Their backs were to the wall of the old city of Shanghai, but that wall has given place to an asphalted road and open space bordered by numerous shops. (One portion of the old wall is to be restored.)

Nanking Road is the major thoroughfare connecting the waterfront with the spaces outside the wall. It generates what the urban geographers call the 100% corner, which in a market society would represent the highest land price per unit of frontage, but in China it would be the highest daily rate of pedestrian flow. On the corners are two department stores, a shop selling leather shoes, and another retailing all kinds of leather goods. That pretty well establishes the consumer values for the persons shopping in downtown Shanghai. Two kilometers of shops on Nanking Road are top of the market. Again there is only a barely noticeable clustering in the types of shops. Apparently the rule is that no more than two shall ever adjoin each other. The variety available is insufficient for any more, if they were clustered, and it does not seem permissible to differentiate customer services. This rule is violated to some extent in the big food store, which contains a dozen enterprises, where some items may appear in the displays of three of them.

Interestingly, the crowdstoppers were the displays in the watch and jewelry stores. The jewelry was undistinguished, and therefore ideologically proper. The Sony Walkman display looked very new, so it naturally

attracted a largely youthful crowd explaining to each other in pantomime what it was all about.

I could spot only five restaurants (they put lace curtains over the lower windows so the passersby cannot gawk at the privileged). I walked into the most promising one (it actually had some seats available and no queue!). The staff did speak English and German, and the maître d'hôte seemed to be very professional. However, at 15 yuan a setting for the mid-day meal, I reconsidered and walked out to try the Peace Hotel. It cost 5 yuan, and 0.60 for a hair cut.

Renmin Park was preparing to burst out in bloom. It was surprisingly empty for a weekday afternoon adjacent to the road which attracted all the visitors to the city. Blue-coated officials paced strongly down the concourses, and a few couples wandered aimlessly. On the outer wall, at the north boundary on Nanking Road a string of photos were displayed, mostly showing people scrubbing the faces of neighborhoods and finishing a road.

For contrast with the #55 bus that delivered me from Tongji to the CBD I took the #24 to the Southwest past the classically styled Industrial Exhibition Hall, layers of old growth, a stratum of shophouses, old industries, captured villages containing housing for skilled workers when they were built, mansions of the owners, more recent industry, older apartments from the 1920s for a middle class that was rapidly expanding then, some great houses with high walls and still higher trees, a strip of somewhat modern industry, four-story, and then five-story housing, the latter still in raw ground. A kilometer beyond I could see the cranes for the standard six-story apartments. A former village along the end of the way is step-wise giving way to six-story apartments, while closer to the center these

white-washed cottages with tile roofs and plastered lath walls are being demolished in favor of 12-story elevator apartments. All this makes sense because they are on a direct route to the strip of shops on Nanking Road--if they can get onto the bus. The crowd is so intense they do not try to collect fares during rush hours.

The premium bus line--#20 on Nanking road--moves out through a corridor of second rank streetside shops (fewer radio-TV shops, photo studios, spare parts stores, and the department stores have less floor space) to a park (Zhongshan), where it terminates. Although other busses continue east I continued by walking across the railroad, across the ring road a few hundred meters beyond and then found myself in a neighborhood of decrepit one-to-two-story houses. Most double story residences possessed a dormer in the middle of the roof with a window that was soot-covered.

My nose was assailed with odors not particularly vile, but merely interesting. Coal tar pitch could be detected, and with it a fermentation process, probably a brewery. However something else besides mash was also cooking. Suddenly my walk brought me to the banks of the Wusong River and there the raw splendor of soot-covered industry could be viewed along both shorelines--rolling mills, textile weaving, dyeworks, machine shops, boilermakers, paint mixers, chemical reactors, and the lot. Thin black pipes raised a few meters above the roof lines spewed brown-black fumes. Vectors of human epidemics would have a hard time transferring from one host to another in that carbolic environment.

The people looked and lived like factory workers elsewhere in the world. No Mao caps in these neighborhoods (had they all been taken to work?), but many with tousled hair exhibiting more than usual camaraderie.

The industry beyond has townships that are poorly connected to the center of the metropolis. The skyline looks like a bit of Cleveland or Youngstown in the 1960s, but it is "walking on two legs" as they say here, rather than prostrate or limping, as in present day Ohio.

OLD SHANGHAI

Maintenance of facade is an achievement of Shanghai. Even in the most polluted areas it excels in "keeping face" far beyond any other city in its stage of development. However, in areas just outside and immediately inside the old city decay and debris abound. A few favored cobble-stone routes will be preserved as a living museum; the remainder will be redeveloped. Modern apartments start rising wherever there has been a fire, flood, or some other injury that clears the land.

It does not pay to maintain all the houses left over from the nineteenth century or even earlier. White-washed plaster has fallen away, roof tiles are in disorder, and in some cases they have disappeared altogether leaving tar paper nailed down by strips of wood. Some windows are patched with paper, and the alley workshops have not advanced beyond the most primitive machinery. The alleys themselves are not paved, but have stepping stones to keep the feet dry. They have been encroached upon until only enough room is left for two people to pass, while the roof edges almost touch at heights less than six feet.

The shops on the lanes mostly provide the necessities of life, but interspersed among them are a few dozen that offer arts and crafts. The district is something like El Khalili in Cairo or Old Delhi but those suqs and bazaars have apartments or godowns four floors above, while Old

Shanghai offers only a two-story shophouse or something less. Also, the Chinese shops offer a much higher proportion of "kitsch."

It is my impression that much of the old city must have burned in the nineteenth century. What we see now was once makeshift shelter that was upgraded incrementally and densified over several generations. The ideological fire of communism greatly reduced the diversity of the artifacts. Equalitarianism eliminated the beggars, rickshaw coolies, and twelve hour work days, but it also destroyed the bourgeois elite which supported the creative arts.

Old Shanghai has a major tourist attraction in the two hectare Yu Garden, a sixteenth century version of Disneyland, but reserved for the powerful and influential people of the time. Now it is a place where young people come to photograph each other using its pavilions for backdrop and its ancient plants as alternatives for companions.

I went back on a week day to a different part of Old Shanghai, mainly to find out how people made a living. The Chinese tourism business is primarily a part time occupation, since there seem to be less than a thousand tourists per week, including the Oversea Chinese.

Most of these districts were in slightly better condition, since only 20% of the lanes were cobbled--the remainder were smooth asphalt--and most of the courts were also paved. (Definition: Alleys are 1-2 meters wide at the narrowest points, and lanes are 3-6 meters, roads are 6-13 meters, and frequently have simple fences separating bicycles from automotive traffic. These are descriptive terms and not translations from the Chinese; they indicate what kind of traffic is to be expected.)

I found printing, woodworking, commercial baking, and foodstuff processing, but in nothing like the scale and intensity seen in Taipei, or even India. Vistas of factory chimneys could be seen in the breaks in the roof line on two sides, so there were alternatives to small workshops within walking distance. The smallest possible enterprises, household industries such as gloves, coverlets, seat pads, and knitting could occasionally be seen.

The warm spring day brought out the grandmothers to sit by the doorstep. Many households had greens drying on the same poles as the washing. Old men were playing cards six to a table, with several kibitzers watching closely. Chamberpots, freshly washed, were airing by the door. The traditional version is a ten liter squat barrel shape with a zinc-coated iron tub on the inside, but some people make do with a tinned bucket, or an enamelware pot such as was used in America earlier in the century. The standard type is brown-colored pottery or wood, with a close fitting lid picked up with two fingers.

I had forgotten earlier to mention that the Old Shanghai shophouses built a second floor that was cantilevered a meter or so over the lane, thus protecting the entry to the shop below during rainy weather. The bottom floor would use wood beams or load-bearing brick walls, while the top floor is normally all wood until one reaches the roof tiles. These were dark in color even before being coated with soot and they were laid over sealed tar paper. Most doors were made of simple 4 x 1/2 boards and long ago had been painted red. The upper floor had three small windows with many small panes, and perpendicular siding now rotting at the bottom.

Many houses had knocked out the front wall and built a low chamber in front of it using loose pieces of pavement and bricks which would hold the cylindrical portable stove. The ventilation will prevent asphyxiation of the inhabitants. Chinese briquettes put out a lot of smoke initially. Also if rain falls on burning coals (or if a pot boils over) deadly carbon monoxide is generated. When the houses were built the fuel was either wood or charcoal in a brazier. Therefore these adjustments were probably made in the 1920s when coal became the dominant fuel, but briquettes soon followed. The dormer window, when used, is only a square meter in size, and very difficult to wash. I cannot tell how the attic is used.

This mode of construction is described in some detail because it is apparently indigenous and represents an adaptation to climate and culture. It is utterly different from town and city housing in Guandong and the New Territories. The great dependence upon wood for city building at that time was utterly unexpected. The beams and the millwork seem to be a product of nineteenth century technology. The prevalence of wood explains why I hypothesize a conflagration and reconstruction.

THE RAILWAY TERMINAL DISTRICT

Railways have a powerful organizing force inherent in them that generates special neighborhoods in America, Europe, and India. The terminal is the strongest force of all. People and parcels must be transferred to other means of transport, and allowance must be made for some extended waiting. Taipei, a city of two and a half million with only two tracks of main line (like Shanghai), has a huge station, fourteen passenger loading platforms, and four major bus terminals on the periphery. A dozen hotels,

from the Hilton to Grade C hostelryes, are clustered around the gates.

In Shanghai I walked past the station without recognizing it. What I thought I saw was a small bus terminal. It has only four platforms, half of them open to the weather. Only fifteen trains per day are posted, most of them for overnight trips. Round trip service to the far suburbs does not exist. One tiny snack shop provides food service. One first class hotel is 500 meters away; the others are a kilometer or more. The space for a queue awaiting the arrival of taxis would accommodate no more than a hundred people. Parking space for six three-wheel scooter cabs and four pedicabs was provided. The resurrected pedicabs (probably referred to as cycle rickshaws in this city) looked as if they had been assembled from junk.

A dozen or so third class passengers had arrived with their parcels. Evidently they had made purchases for relatives and friends, so six to ten pieces miscellaneously wrapped in brown paper and crude cloth and twine formed a cluster on the pavement while the owner squatted nearby in the spring sun.

The small adjacent bus terminal is new, and two high rise office buildings nearby (discovered later upon enquiry to be for railroad administration) are nearly complete, so Shanghai has started the modernization process. However, when the line is electrified, as planned, the capacity for moving people will triple. It will take a major work of urban design to fit the surrounding area to the functions of a modern railway station. Mayor Wang has a proper station on his list for 1982, but construction has yet to begin.

A single track goes on to Baoshan, site of a large integrated steel complex once canceled but recently reprogrammed on a reduced investment schedule. It will probably have to be double-tracked to move out the output and connect the township population (ca. 50,000) to the metropolis. Very likely a light railway will have to be built which becomes a circular railway for Shanghai. The complexity of the design far exceeds the experience of the architects I met. Some Hong Kong architects and engineers would very much relish the commission.

TONGJI UNIVERSITY

This engineering university evolved from three two-story high-ceiling buildings around a courtyard for 1000-2000 students which expanded to another larger site at the outer boundary for much longer three-story buildings with a greater courtyard about ten years ago. Recently more buildings were placed parallel to the sides, and special smaller buildings were put behind the library, which holds the central position. Two of these are used for an acoustics laboratory and a computing center, but the others remain unaccounted for. Immediately behind is a stone and concrete-lined canal that has been freshly landscaped. In about three years it will produce a pleasant study retreat for students. Altogether it is becoming a modest statement of Chinese institutional style that presently serves almost 7000 students and almost 2000 professors and staff.

Across Siping Road the township of the university contains a few two-story terrace buildings with slight vestiges of the German Christian origins of Tongji. The slightly younger 66 two-room apartments are now being remodeled, but they still give the appearance of a church without a steeple

when seen in dim light. The subsequent buildings are mere boxes, first four-story apartments, then five, and in the last few years, six. The master plan prepared about five years ago did not take into account the added housing height standard. Nor did it show the guest-house with its large Chinese style 2-DK apartments with boiler room and gate house. Thus the township displays a recapitulation in architectural terms of forty years of Shanghai, including the eleven year hiatus caused by the Cultural Revolution and the rule of the Gang of Four, when most of the professors were engaged in paralyzing self-criticism and were sent off to labor in the agricultural communes.

My first session was with a dozen faculty and a few advanced students, two of whom had been selected for going to America, both expecting to apply for Berkeley in 1983, when their English has been perfected. I had about ten questions to raise, but first had to describe conditions and experience elsewhere in the world which suggested that a new facility should be set up in Shanghai, or why a certain mode of transport seemed to be missing, etc.

The most unexpected finding was the unanimity of agreement about the livability of apartments in the six-deck buildings. The third and fourth floors were acknowledged the best because they were warmer in the winter and cooler in the summer. So far the families are too young to put a premium on living on the ground floor without steps to climb, instead they resent being cut off from the warmth of the sun in the winter caused by the shadow of the building in front of them. The top floor has an uninsulated roof, and the north wind howls by in the winter sucking out what little warmth they can generate. (Shanghai is at the northern boundary of the half of China where home heating is not allowed.) When I asked about

improving the livability of the apartments, suggesting what I would do if I was a designer, I received a realistic reply. My suggestions were a part of the teaching of design, but in the practical world (it was implied) there were targets for producing housing to be met, and the use of insulation, for instance, would probably reduce total housing output, which top authorities could not countenance. Despite public claims to the contrary, quantity is what counts in Shanghai; quality is a lesser consideration. A few lesser cities are said to be different. The session lasted four hours without a break, and individuals who hung on had to be dealt with afterwards.

The next morning I started lecturing on "The Design of Resource-Conserving Cities," finishing the alternate English with Chinese translations a paragraph at a time at 10 AM, answered questions to 11:30, again without a break. The Shanghainese are indefatigable, despite the hard wood benches.

That afternoon at 1:20 three faculty and a prospective Berkeley student arrived at my apartment. The environmental planner was trying to discover in what way ecological thinking changed the urban planning process, discovering to his surprise that he already understood the principles but they had been stated with different Chinese terminology, nevertheless he still struggled to find much more. The use of statistics by ecologists was not familiar to him; he dealt in the use of the language to lower level technicians, and his problem-solving was by the uses of the Chinese written language as standardized for bureaucratic communications. He had become a priest of a new environmental religion, one that could not be condemned by Party theorists, and sought a doctrine.

The prospective student needed to know about living in Berkeley and understanding our mode of argument. I recommended she study her English out of statistics and micro-economics books in the Library. I had surveyed its limits a few days earlier, finding they have about a hundred modern books relevant to planning in English and about fifty in German. Half of them came from minor publishers. Of the planning journals only Raumordnung was available.

The student's professor, the recently retired Dean of the college, had studied under Cropius at Harvard in the 1940s. He was a great help in explaining the advantages afforded by the opportunity to study other subjects than planning, and in finding words to express the definition of a planner as a "generalist with a specialty," since the concept did not translate directly. He was better informed about the policy process than the others, and of course had lived through more of the history.

This session also lasted four hours. They enjoyed every minute of it, and Zhong, the former dean, remarked that it was the most pleasurable afternoon he had had in many years. It was obviously not meant to be a politeness, but a statement of satisfaction about regaining contact in depth.

Associate Professor Owen picked me up at dawn for the trip to the airport; we collected Ms. Chen, very recently returned from Calgary where she was a visiting scholar, along the way. My last yuan combined with \$5 paid the airport tax, and the last fourteen fen was accepted as payment for the China Daily. I left Shanghai without a single fen as a memento. In Hong Kong I would be in contact again with a familiar world.

Part Three

WHAT SHANGHAI CAN DO FOR THE DEVELOPMENT OF CHINA

What sense can be made of these scattered readings and observations?
What could a planner recommend for the Shanghainese?

First a general observation can be offered. Shanghai has quite a bit of unused capacity in its physical structure, its organizations, and its labor force--much more than most developing metropolises. An open-minded approach, together with small amounts of capital should be able to extract at least another 30% more goods and services (mostly the latter) out of the existing equipment and land uses. An alert society, such as seen elsewhere in East Asia, could do this within five years. That would be on top of the expanded output of light manufactures and the programmed extension of infrastructure. This was an unexpected finding. What needs to be changed mostly are attitudes about working hours, pace, the extension of responsibility to individuals, and the organization of small producers' co-ops.

This brief investigation brought into the open the stated top priorities for bureaucratic attention, including capital allocation, at the national level. The actual behavior reinforces the belief that these are operating priorities as well.

PRIORITIES FOR ALL CHINA

1. Industrialization
2. Family Planning
3. Housing
4. Environmental Hygiene

Obviously those projects and programs that address two or more of these most deserve to be financed and expedited. It is not difficult to uncover such developmental potentials, but it may be more difficult to assign clear responsibilities for carrying out the tasks. Such projects and programs ought to be explored first in the most knowledgeable centers--the research institutes and the universities--before being launched, so as to maximize the likelihood of success.

The priorities have already been translated into programs for expanding university education (CD, 17/6/82). In order of importance they are as follows:

economics
law
English
geology
mining
energy
mechanical engineering
construction
light industry
grain processing
transport and communications

Of the 310,000 1981 graduates, only 20% were placed in the Government. The remainder went into local activities.

Certain tasks have been assigned to Shanghai because it, among all the cities of China, seems to be the best equipped for carrying them out. As far as I know these have not been stated, but they can be inferred from statements in the press and the responses of my academic informants.

SPECIAL SHANGHAI OBJECTIVES

1. Foster exports, by enhancing quality and design
2. Conserve urban space
3. Energy efficiency
4. Water supply improvement
5. Maintenance of fresh food sources

The list is stated in terms of present emphasis, but emphasis could easily change as a result of a local catastrophe or a notable incident. Actions initiated by Shanghai city officials can often advance its ends at the same time that they address the priorities of the nation. These are obviously the most favored projects.

The planners must also worry about constraints built into the existing system. They will always be looking for ways to overcome such difficulties.

SHORT TO MEDIUM TERM LIMITATIONS

1. Rail and harbor capacity bottlenecks
2. Technologically trained manpower scarcity
3. Youth unemployment
4. Telecommunications network overload
5. Wastage induced by current subsidy programs

As one looks closer many more of these begin to emerge. No one of them dominates the others. Planning in Shanghai will succeed only if it identifies the roadblocks and bottlenecks, and plots a path through or around them. Experience counts for far more than theory.

A bit of forecasting is also necessary. As the new price structure equilibrates, the relative income of Shanghai with respect to the rural areas will be reduced. For the first time some Shanghainese are thinking of going back willingly to the rural area, because the farmers they see are markedly more prosperous than low-skilled workers. I believe that Shanghai still will be producing 4-6 times as much per capita as the Chinese average, but the differential will be more modest with respect to the provinces in its region. It is already a remarkable engine for development, but the prosperity does not spill out very far--except for the impact of its tax collections and the returns from state enterprises upon Beijing.

There are stories of productivity teams from Shanghai visiting other cities in the Yangtze basin to assist the local management to overcome bottlenecks and improve quality control. Elsewhere in the world we would

call them management consultants and consulting engineers. A very likely consequence will be increasing the interdependence of industrial installations between cities. Much more information will flow back and forth, the new products and instruments will find their most sophisticated users in those plants, while Shanghai enterprises are thereafter able to pick up some convenient supplies of intermediates. As long as these relationships remain on a voluntary basis the initial exchanges should be highly productive. The UNDP (United Nations Development Program) has been stimulating these connections through regional seminars, particularly in the area of energy conservation. The universities need to be brought into such exchanges to a much greater extent in order to make better use of the talents of the faculty and the new graduates. In most places in the world I could go on to describe how such a recommendation could be implemented, but my knowledge of China is so thin I cannot offer a good precedent or example.

THINGS SHANGHAI CAN DO FOR ITSELF

Shanghai is obviously the best place in China for an ultra-modern industrial estate. Half of it could take the form of an Export Processing Zone to encourage some of the multinational firms to establish plants. So far only Occident Petroleum of Los Angeles and the Foxboro group of companies (instrumentation for chemical processes) seem to be enthusiastic, but findings of natural gas in the estuary seem highly likely, and petroleum is a real possibility (this is one time that proximity to a seismic zone could be providential, because fractured impermeable rock is better able to trap hydrocarbon fluids). Hundreds of the world's high technology firms are known to follow the oil strikes. The organizational

formula for Shenchén in Guandong near Hong Kong, which permits Chinese to contribute the labor input to labor-intensive manufacturing then exported to the world, would not contribute much to Shanghai.

The basic policy decisions have already been made, but now the planners have to choose alternate paths under conditions of great uncertainty. The best strategy under such circumstances is to make several diverse attempts at founding a quickly expanding industrial estate. Shanghai is big enough to support more than one if several should find a formula for success.

Both energy efficiency and atmospheric cleanup can be achieved by setting up combustion controls on the boilers and furnaces. Large gains have been made in this respect in Japan and the West. The price structure for fuels also needs to be drastically changed to make this efficiency enhancement look profitable to the lower levels of management who make day-to-day decisions, but those policies are not decided in Shanghai. Waste heat from power plants could produce thermal comfort for hospitals and for the elderly, but this kind of energy conservation takes more time and capital. The briquettes used for cooking and hot water can be improved by mass production methods known to the Japanese and the South Koreans, and the returns from installing better insulation and draft controls in the household stoves would begin to multiply after a few years.

Shanghai is not as badly off with respect to water supply as Beijing, where the drought, until it was broken in mid-June, was truly critical. Disaster was averted in Shanghai several years ago when pumping from aquifers directly under the city was halted and reinjection of water was undertaken to reverse to some extent the sinking of the city into the

effluvium of the Yangtze. Nevertheless a raised seawall is needed at the Waterfront (Bund) to protect against wind-driven high tides. A new treatment system has been authorized; apparently more of the Fragrant Hills will be used as terrain for water collection, but details are not available.

The water in Suzhou Creek and other channels in the estuary is already reused several times. That is one of the reasons these streams are so polluted. Wastewater treatment should proceed slowly in most instances, using tests of the growth of vegetables (including uptake of heavy metals, etc.) as indications of priority for concreting the canals, treating them as open sewers. Information obtained from drilling for oil may identify deeper aquifers that can be safely tapped to support the future growth of the metropolis.

Henceforth Shanghai will be forced to consider another resource--human time--in its drive to become more efficient. After the presently unemployed youth are put to work in services, the succeeding age classes of locally born entrants into the labor force will be reduced by the drive for the one child family. The birth rate will be sustained by the recent flurry of marriages for a short while, and then fall off. The birth rate was at a relatively high 16.7/1000 in 1981, which helped push the estimated total Shanghai population beyond 12,000,000 (World Economic Herald, Beijing, 13/4/82), including 400,000 in a "floating population," and recent returnees from the rural communes. Full employment has already been reported from several smaller Chinese cities, so it should be expected soon for Shanghai.

Saving time is mostly achieved by elaborating human services, rendering them more convenient. Fortunately literate unemployed youth are

available for extending the hours of shops and for forming distributive co-ops to deliver perishables to households where all adults work or are affected by infirmities. A significant number of Party members is retiring to Shanghai, so the latter category of customer will become important. The principal equipment involved is the standard 3-wheel cycle cart or the somewhat larger pushcart. The supply of both is scheduled to increase rapidly, but specialized designs should also be considered after routes have been established and special drawbacks have been identified.

A whole mode of transport is missing in Shanghai; small groups of people need to be moved conveniently from origin to destination and return with a low expenditure of energy and capital. Small scale scooter motors can be constructed which are virtually pollution-free. They can be attached to a 3-wheel chassis to carry out the following function: (1) micro-bus for 5-8 people, (2) parcel delivery van for shipments up to 300 kg, (3) a substitute for the multitudinous rural power tillers that invade the city, (4) a cheap taxi especially needed in the peripheral areas of the city, (5) a tool-carrying runabout for engineers and skilled workers, elsewhere called sales engineering representatives, responsible for maintenance and repair. To make full use of such vehicles the roads must be kept in better repair at the margins normally relegated now to the bicycles. Underpasses and new kinds of traffic controls will have to be installed at a number of strategic points. Systems thinking for these forms of para-transit is recommended.

Telephones that connect major offices and the gates of the residential neighborhoods are already found increasingly useful for coordinating activities. The new exchanges should be of the solid state, computerized

type that will accommodate the cheap portable telephones due to be available in the latter part of this decade. Shanghai will be limited for decades to come by a shortage of professional and technical workers; expanding the telephone and data collection networks can add immensely to their capacity to take on more work. Computing can come later, when the data become more standardized and reliable.

I can imagine a Shanghai of the 1990s that offers a capacity for a high volume of transactions of increasing variety. It reaches out on one side to many other Chinese cities, as well as its own belt of vegetable farms. It will have learned to conserve resources, particularly energy and water. It will know much more about the other side of the world which will buy its export-oriented output. I have neglected detailing the measures required to interact effectively with the outside world because those policies will almost always be centrally determined. I will watch to see what kind of momentum can be achieved.

A NOTE CONCERNING THE EFFECTS OF CHINA'S FAMILY PLANNING STRATEGY

Infants are scarce in Shanghai and Canton. A major behavioral change in the urban population was triggered as soon as the one-child family norm became common during the 1970s. The 1971 natural growth rate for China was 2.34% per year, but by 1979 it was claimed to have been cut by exactly half. The changes in culture and personality, and revamping of community institutions like schools, is just beginning.

Teenagers are presently in oversupply, while children now of elementary school age are finally fully accommodated and their examinations and study requirements are being relaxed this year to save eyesight and promote opportunities for exerting skill in sports and leadership. Infants and very young children are "cossetted," to use a word favored by Hong Kong Chinese journalists. They are carried around long after they are able to walk, and fathers seem to have taken over transporting the child more often than the mothers, who usually have housekeeping to do after a day's work, and much more often than the grandmothers, whose traditions for bringing up children no longer fit the new expectations. These observations do not correspond with frequently confirmed reports of only a few years back.

Consider the changes in the language and in filial duties regarding the lineage on holidays, funerals, and such. Linguistic honorifics apply to relationships like "elder brother" and "younger sister," and less importantly to uncles and cousins. Will the daughters be expected to behave like sons? Certainly they will receive the same amounts of education, serve in the military, and be granted almost the same opportunities for promotion as for the males. They will also be wearing pants Western style! No doubt exists, however, that they will still be under pressure to produce sons, so assymetry remains.

In Western societies the single child matures intellectually more rapidly. In competition with children from larger families they drift more often to scholarship and the arts rather than popular leadership and enterprise. These tendencies need not be replicated in China, but the new relationships in a smaller household suggest a major change in the direction of the unknown.

In Britain when the families became smaller the lineages were continued by hyphenating the parental surnames. In China the custom for leading women has been to retain their full name, but their children have so far been assigned only the paternal surnames. Is an innovation in order?

The housing shortage in the cities, and the pattern of being assigned quarters in tied townships associated with employers, causes increasing separation from grandparents. The frequency that a child will be raised largely by a grandmother is already greatly reduced, and will probably become even less in the future. Therefore the "grandmothers' rebellion" that was once informally forecast by sociologists specializing in China--a phenomenon which could sabotage extreme family size reduction, seems less potent in the light of simultaneous developments. Nevertheless, an increasing number of grandmothers were reported to be pestering daughters-in-law to have a second pregnancy, despite contractual commitments to community authorities, and Jonathan Mirsky, a sociologist writing in New Society (UK) (18/2/82) claimed that 47,000 Cantonese women were forcibly aborted. This amounts to more than 30% of the birth rate, but to put it into perspective, the proportion is less than the number of voluntary abortions in other Communist societies where official policies favor larger families. Coercion in family size reduction resulted in very serious backlash in developing countries like India and Pakistan, so there may well be induced certain latent stresses that will erupt later. Early marriage and rejection of the one-child family seems to be strongest away from the cities in the heartland of China, e.g., Sichuan and Hunan (FEER, 9/7/82).

Sociologists, social psychologists, and social anthropologists are exceedingly scarce in China (the first national meeting, held in July 1982,

is reported to have attracted only 350 persons to an auspicious occasion), so they cannot be expected to have launched any major program of research on the impact of the one-child family. The popular arguments, as reported by visiting Overseas Chinese, have revolved mainly around economic issues. If the popular new "responsibility policy" in agriculture is maintained, the extra hands can add significantly to a family's earning power ("the peasant's seven year plan for producing a child worker").

Professor C.C. Ching, Institute of Psychology, Academia Sinica, Beijing, reduced the problem of assessing impact to the responses to the two principal methods of propagating the one-child family. The first is an assessment of attitudes toward the contracts with the local family planning agency at the time of marriage. The second is the reaction to promotion of moral education by civil servants, such as the "Learn from Lei Feng" movement. About a tenth of the people interviewed appear to be voicing regrets. He notes that frequency of genius is significantly higher among children from one-child families. Higher academic achievement among those at ages 7-10 is attained by 80% as compared to 19% in multiple-child families. In the kindergartens there were only half as many non-cooperative children among those from one-child families (already 80% of all children), but the capacity for engaging in play seemed reduced.

In the United States the strong cultural belief that single children are disadvantaged cannot be confirmed. When such children come from intact families they have higher I.Q. and more rapid intellectual development. Moreover, they do not suffer from loneliness. What has been learned most from American research is that cultural expectations are unlikely to be borne out (Studies in Family Planning 13, June/July 1982, pp. 208-21).

What seems to be needed now is a stream of social innovations that introduce "sibling substitutes" into Chinese society. An elaborate set of adoption procedures can be invented which allow the attachments of the honorifics to other meaningful individuals in the proper age range.

Taiwan has evolved, within a dozen years exposure to economic advancement and television, the "modified, improved extended family for perhaps 20-30% of the population. In market-oriented Taipei it brought about a change in the design of apartment buildings quite promptly" (John Liu, Ph.D. Dissertation in Architecture, University of California, Berkeley, 1981). The Mainland has less wealth, so its adjustments must be more social and cultural than physical.