

International Perspectives in Water Resources Planning in China

May 20 - June 3, 2000



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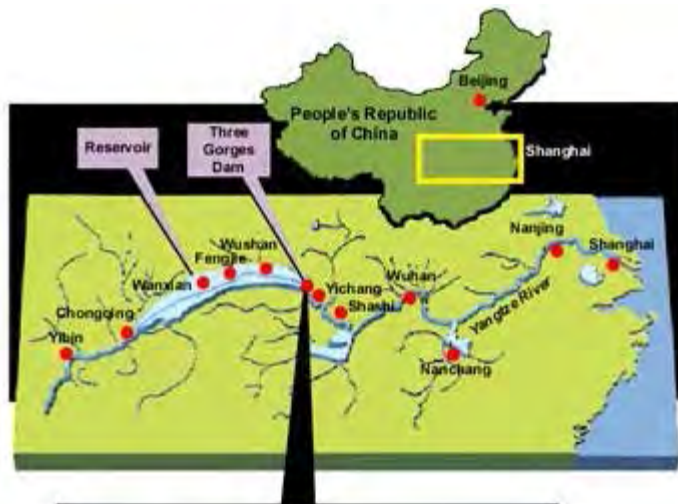
"The human cost? To quote the Chinese, 1 million people are affected by moving, but 100 million people downstream are affected almost yearly by floods. In very few other countries can it be said that the human cost of 1 million people can pale in comparison to any other cost. Yet here it does."

- China 2000 participant

University of Iowa Study Abroad Programs**International Perspectives in Water Resources Planning in China****May 20 - June 3, 2000**

An initiative of IIHR-Hydrosience and Engineering The University of Iowa College of Engineering, Iowa City, USA

in collaboration with
Wuhan University of Hydraulic and Electrical Engineering, China
Tsinghua University, Beijing, China
Hehai University, Nanjing, China

**Purpose**

The University of Iowa International Perspectives in Water Resources Planning study abroad program focuses each year on a country or a world region for an intensive and in-depth exposure to historical, cultural, social, economic, ethical, environmental, and political conditions that impact water resources projects in order better to prepare students for careers that are becoming increasingly global in nature. The 2000 program takes place in China.

**Academic Program**

The course will start with preparatory lectures by experts on the history, culture, and water resources projects of China. Lectures will be held on The University of Iowa campus during March - May 2000, and video taped for viewing by off-campus participants. The course finishes with post-visit written reports by participants. During the visit abroad, participants will interact with local students and attend seminars by local experts. The seminars will emphasize the planning, socio-economic and environmental impacts, rehabilitation programs and problems, legal, cultural and institutional aspects of water resources projects. Participants will visit technical, historical, and cultural sites.

Specific Activities Tentatively Planned

In China, workshops and seminars will be held at government agencies and universities. Many activities are planned to encourage interaction of course

participants with Chinese students. In Beijing, the technical focus will include a field trip to the Miyun Reservoir and a visit to Tsinghua University and the Academy of Water Sciences. The participants will also tour the Great Wall. In Wuhan, participants will visit Wuhan University of Hydraulic and Electric Engineering (WUHEE), have discussions with Chinese students, and travel to the Three Gorges Project site near Yichang. In Nanjing, the trip will include a visit to Hehai University and Nanjing Institute of Hydraulic Research. In Shanghai, students will visit the Pudong Development area.

Instructors and Credit

The course will be conducted by Professors Jacob Odgaard (IIHR and Department of Civil & Environmental Engineering), You-Kuan Zhang (IIHR and Department of Geoscience) and Lea VanderVelde (College of Law), at The University of Iowa. Each participant can earn 0-3 semester hours of credit depending on agreement with the instructors regarding assignments and methods of evaluating student's work.

Cost

The estimated total cost for the program is \$2,800, including fees, round-trip airfare, lodging, meals and travel expenses abroad, and all educational and administrative costs. *Participants are expected to pay for their travel to and from China and a portion of their local expenses.* Financial aid may be applied toward program costs. Students may also apply for a grant from IIHR for up to \$1,400.

Eligibility

The course is designed for seniors and graduate students who wish to become engineers, economists, planners, legal and management specialists, and environmental, social and political scientists. It is also suitable for professionals and young faculty members working in these fields. The course provides preparation for the increasingly international scope of practice and service in water resources planning and management.

Application Procedure and Deadline

Completed applications must reach The University of Iowa's Office for Study Abroad by February 29, 2000. The complete application includes the application form, available from The University of Iowa Office for Study Abroad, the most current transcript of grades, a letter of recommendation and a non-refundable application fee of \$50. Applications will be reviewed as they are received, so early application is encouraged.

Previous Courses

Some student reactions to the previous courses in India and in Taiwan and Japan are as follow:

"It has made me a better person...The lectures gave us an entirely new outlook on the issues related to water resources in India..."

"Meeting with students was an invaluable experience, one of the most

important parts of the trip..."

"This experience will be invaluable to me in my professional career...altogether a worthwhile investment of time and money."

"I hope this class will continue. I thoroughly enjoyed the trip and recommend the course to anyone."

Send completed application and requests for further information to

Office for Study Abroad
28 International Center
The University of Iowa
Iowa City IA 52242
Phone: (319) 335-0353; Fax: (319) 335-2021
E-mail: study-abroad@uiowa.edu

Also visit

IIHR at its Web site:
<http://www.iihr.uiowa.edu/>

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2000 IPWRM - China

A Brief Pictorial Recap





















国营照像
GREAT WALL STUDIO
骑骆驼 穿服装
好汉留影





请您严格遵守交通法规

































三峡水库淹没、移民安置范围及城镇迁建规划示意图



长江水利委员会绘制 一九九二年十二月























































International Perspectives in Water Resources Engineering 2000 : CHINA



A Brief Introduction

This course began in 1998 taking participants to India. In 1999, the course focused on Taiwan and Japan.

This year, the focus was on China with special attention on the Three Gorges Dam Project.

The journey begins.



May 20 and 21, 2000

- Got up at 5 a.m.
- Started out at Hartmut's place where we met up with Simone, Jens and Fernando.
- Met Troy, Justin, Paul, Heather, Mandy and Jennifer at the Eastern Iowa Airport along with Profs. Odgaard and Weber, Dr. Lai.
- Took off for O'Hare, met Andy, Amanda and Scott and off to Narita, Japan we went.
- At O'Hare, we were warned not to sell our tickets for a later flight (an opportunity stopped).
- Arrived in Beijing, late the night of Sunday, May 21, 2000. Met Profs. Zhang and Vandervelde who had arrived beforehand.
- Got paired up with Paul at the Zi Yu hotel.
- Some people apparently went out, just knocked out.



May 22, 2000

1st Impressions of Beijing

- Got up not entirely fresh but that's too be expected after 16 hours in a plane.
- Had to remind myself, tap water is not safe for anything.
- Breakfast was a buffet which apparently was northern Chinese style of buffet but not exactly my cup of tea. (Which sort of proves my southern heritage.)
- Early morning walk made me think that Beijing was quiet (refer to the top photo showing the hotel). This was of course rudely interrupted by the trip we took by bus to our first destination. (refer to the bottom pix and we actually were not in the rush hour, yet).



May 22, 2000

Institute of Water Resources and Hydropower Research, Beijing

- After breakfast it was on to our first stop, the IWRHR Beijing.
- 2 seminars were given before lunch.
 - The first was on the Three Gorges Project(TGP).
 - Given by Dr. Huang Zhenli; Exec. Officer of the State Council TGP Construction Committee.
 - Basically presented facts and figures of the Three Gorges; organizational structure; and a brief history of the project. (Refer to Appendix 1)
 - The second seminar was an assessment of the Water Resources in China.
 - Given by Dr. Chen Minjian from IWRHR Beijing. Unfortunately the talk was completely in Mandarin.
 - What I managed to get from it is that
 - China is suffering and planning for a water shortage that will reach its peak in 2030 - shortfall of 400 km³.
 - Mainly concentrated in cities especially the northeast.



May 22, 2000

Tsinghua University, Beijing

- After lunch we went to Tsinghua University
 - Some background
 - Established by China as reparation for the death of American Missionaries in the Boxer Revolution
 - Attended a briefing and had some discussion on the TGP.
 - Same facts again. My impression was that the Chinese officials and scholars wanted us to be aware of the physical facts of the dam.
 - Found out more on the environmental impact of the dam than this morning's seminar.
 - Learnt the TGP's dam operating rules "Store clear, Release turbid"
 - Had an open session with the students, actually they barraged us with questions on the US , IIHR and admissions. Which pretty much left us as visiting ambassadors for the lab and the university.



May 22, 2000
Tsinghua University, Beijing

- After the discussion and seminar we proceeded to visit their facilities and campus.
 - First up was the physical model with sediment which they had built for TGP to study flow downstream.
 - Unfortunately for us, this was the last model which we saw throughout the trip which was either operating or even working while we were around.
 - Our tour included a visit around their whole campus. New and old.



May 23, 2000

Miyun Reservoir, Beijing Outskirts

- Up early for breakfast and the long ride out. Reached the reservoir at 1120. This is the main problem with the ring-road system.
- Some details
 - 1st large reservoir in Northern China after 1948.
 - Has 2 major and 5 minor dams
 - Storage of 4.375 billion cubic meters.
 - Supplies 50% of Beijing's water needs.
 - From 1982, the water in this reservoir only supplies Beijing.
- Had our most interesting lunch of the trip here. All the aquatic food came from the reservoir itself



May 23, 2000

Miyun Reservoir, Beijing Outskirts

- Just an idea of the size of one of the major dams
- Bai



May 23, 2000

Tour of IWRHR Facilities, Beijing

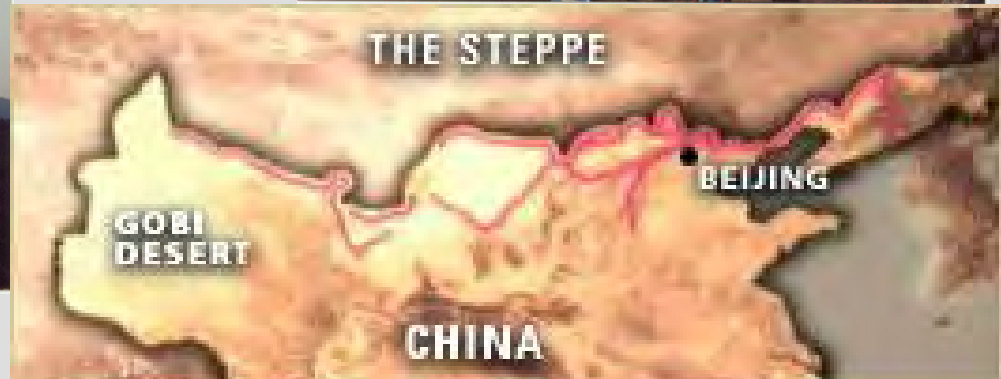
- Afternoon was taken up with a tour of IWRHR Facilities
- They do more diverse research than us, ranging from dam stability to gravitational force tests (clockwise from Top Right)
 - Centrifugal chamber - to test hydraulic g-forces on dam models and also used to test spacecraft models.
 - Vibrating table - to test g-force on dam model
 - Low pressure chamber (related to TGP) - testing of aeration of discharge.



May 24, 2000

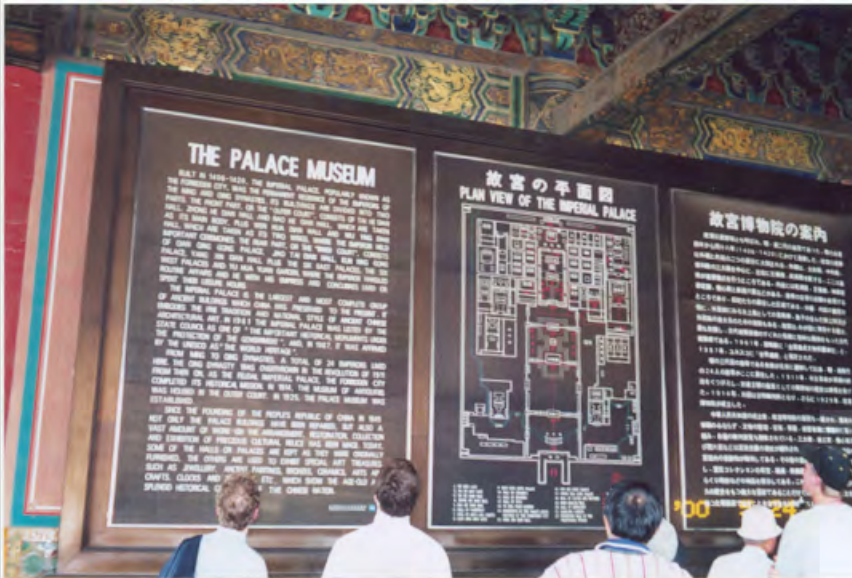
Great Wall Tour

- Visited the Badaling section
 - Hiked up but took the cable car back
 - The locals were very enamored with a huge group of Caucasians and we had to stop for a number of photos with them.



May 24, 2000
Forbidden City

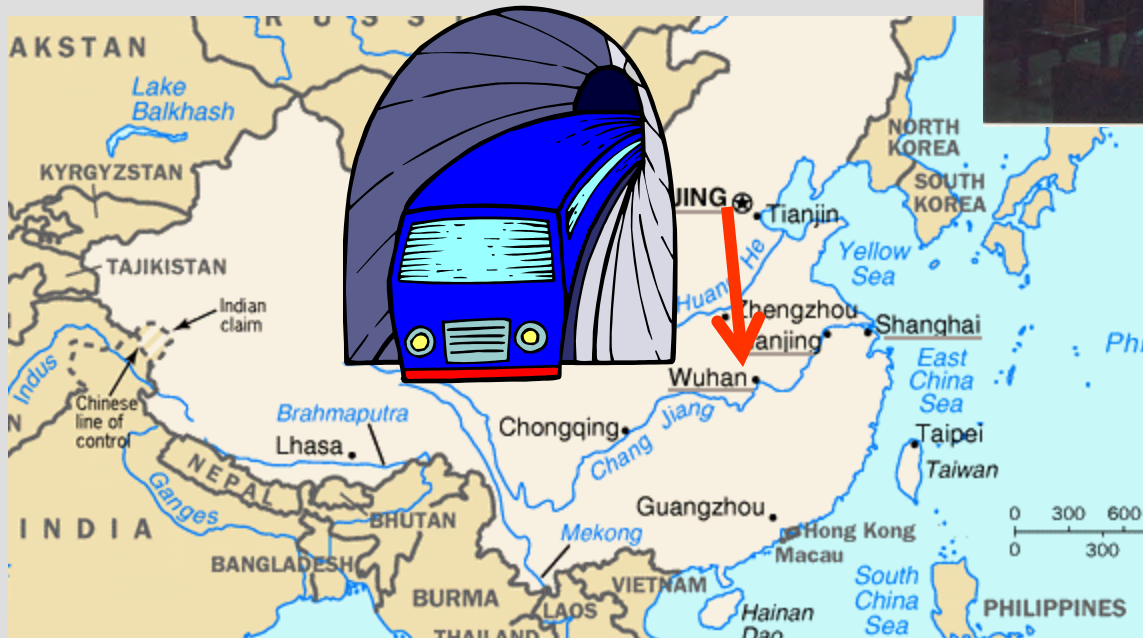
- The Forbidden City (or locally known as the Palace museum). Beautiful, but the touch of commercialism has reached everywhere even China.



May 24, 2000

Leaving Beijing for Wuhan

- Departed from Beijing Xi (West) Train Station to Wuhan. Got stuck with Prof. Weber, Dr. Lai in the cabin and Paul. Nah, not true. It was fun. The train was a fast sleeper. Looking at their trains and stations, I think the West has to upgrade their facilities and quick.



May 25, 2000
Wuhan

- Arrived in the rain. Not nice for us but to the locals we were good omens. Seems they hadn't had any precipitation for 3 months.
- Had a great breakfast (to me and Dr. Lai, that is.)
- Then went visiting their sedimentation laboratory and other facilities here.
 - Brief tour of their TGP facilities including their model of merging spillways. Not a good idea but required because of constructional savings in cost.



May 25, 2000
Wuhan Tour

- Afternoon, and still the rain has not stopped.
- Went for a tour of some of Wuhan's historical sites including
 - East Lake
 - A Museum which was very interesting, displaying plenty of local historical rarities



May 25, 2000

Wuhan Night

- After dinner, we got to party (officially) with their students. Started out a bit stiffly, but most of us sort of paired up and sat down with groups of WUHEE students and then things began to loosen up.
- Scott and Amanda performed a Salsa to match a performance from the WUHEE students. This in addition to Justin's hackysack demo.



May 26, 2000

Wuhan Seminar

- Woke up, had another great breakfast.
- A seminar was given by Dr. Xie on the TGP but with special concentration on the sedimentation in the river and problems with the dam.
- After a good discussion, ended up still a bit uncomfortable with the details presented.



May 26, 2000

Wuhan Dorm Visit and Basketball

- Afternoon saw us going to their dorms and a basketball game
 - I must admit as an Asian I was still surprised at the number of people they squeezed into their rooms. (8 persons to a room about the size of 2/3 the HL classroom, with a table running down the middle and
 - Interesting discussions about life cropped up and because I was with Hartmut, I got to see that most Chinese are very ardent on coming to the USA but not Europe. Singapore's fine as a second choice but Europe apparently does not figure.
 - Basketball ended up in a draw. I will say it was a very close and competitive game. Did I make a basket? No, unfortunately.



May 26, 2000

Leaving Wuhan for Sanxia

- Evening time saw us leave to board a vessel at Yichang (200 km away) to take us to Sanxia



May 27, 2000

On the Chang Jiang to Wushan

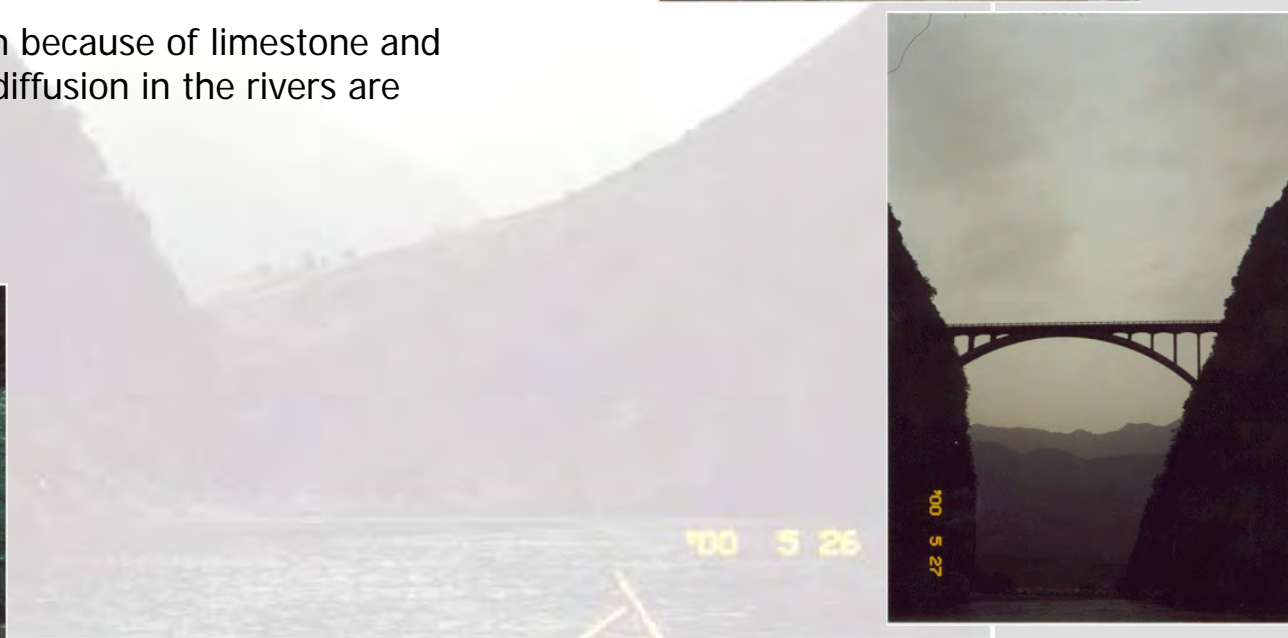
- Morning saw us approaching Wushan to take a boat to the Mini 3 Gorges.
 - This is where I got my first view of both the condition of the river and the effect that the TGP will have on cities and towns upstream



May 27, 2000

On the Mini 3 Gorges

- Arrived at Wushan. Boy! It's a fantastically tight city. Went by bus to a harbor for shallow-draft boats to take us to the Mini 3 Gorges.
- Saw some beautiful sights and unbelievable stuff
 - Saw a recently built bridge that will be unusable when the dam fills.
 - Learnt that river is green because of limestone and saw that the horizontal diffusion in the rivers are very small



May 27, 2000
Bai Ti Shen

- Rushed back to the boat to be ready for the trip to Bai Ti Shen (White Emperor Tower)
- Unfortunately we didn't leave until late evening.
 - Getting tough to eat on board. Have to have a full table to eat and people don't appear to want to sit with us, must be the language barrier.
- Reached Bai Ti Shen at night.
 - Think we were actually the last group to go for the night. Interesting place. Had a diorama of a scene from the Romance of the 3 Kingdoms.
- Went to bed early, missed out on the all-night Karaoke



May 28, 2000

On the Chang Jiang to Yichang

- Got up early (thanks to the ship's use of blaring music). Took photos of the Xiling Gorge, used to be famous for tearing the bottoms off ships.
- First view of the TGP
- Got a view of the first dam on the Chang Jiang - Ge Zhou Ba



May 28, 2000
Yichang

- Got off the vessel early evening. Went to our hotel. We seem to be moving up in the world now. Went on our first day-trip without plans. Visited the city before dinner.



'00 5 28



May 29, 2000

Sanxia (TGP) Construction Site

- The size of the construction is just huge. Wish we had been able to get the construction team to take us around. Have definitely more questions now that probably will remain unanswered.



May 29, 2000

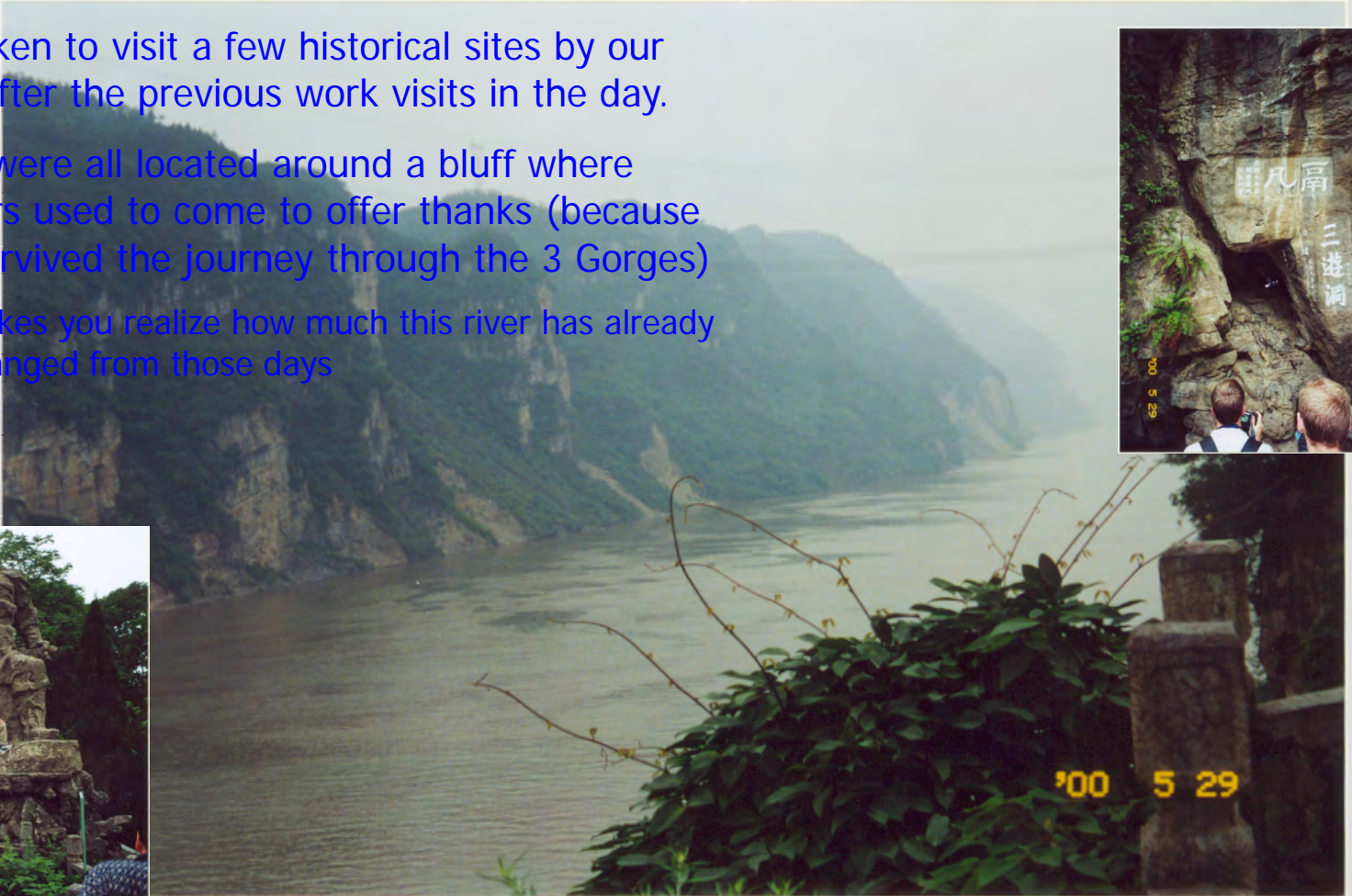
Gezhouba and Yichang

- After lunch, proceeded to Gezhouba (1st dam on the Chang Jiang). Not allowed to photograph inside the plant nor step on the hydropower floor.
- Then went to a center for Chinese sturgeon
 - It is considered endangered with both dams in place. The Chinese have come up with a different philosophy from the USA, they just release more fry and produce them. At the moment it works in terms of numbers. However in the long-term, no one knows what is going on.



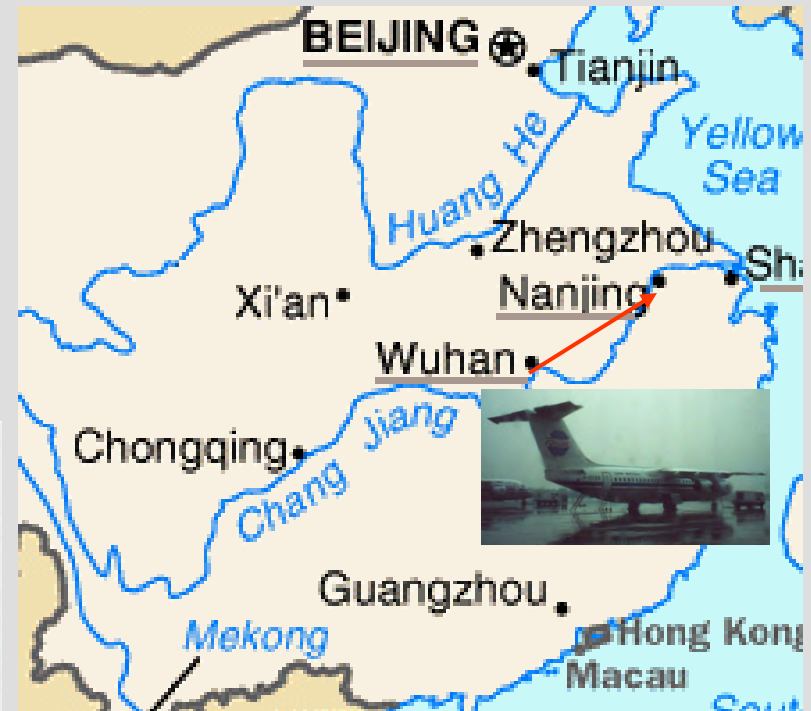
May 29, 2000
Yichang

- Was taken to visit a few historical sites by our hosts after the previous work visits in the day.
- These were all located around a bluff where travelers used to come to offer thanks (because they survived the journey through the 3 Gorges)
 - makes you realize how much this river has already changed from those days



May 30, 2000
Travel Day

- Got up early to take a bus. Arrived in Wuhan in time for lunch. Dropped off our gracious hosts who followed us throughout from the day we arrived in Wuhan.
- Proceeded to Wuhan airport for a flight to Nanjing. Learnt that in China if you want a good seat you rush in. No seat numbers given. Profs Odgaard, Weber and Dr. Lai left us at this point.
- Arrived in Nanjing, met by the Dean of Civil Engineering, who also happens to be Prof. Zhang's university mate.



May 31, 2000
Nanjing

- Official Welcome to Hohai University by the Vice-Dean. We are really coming up in the world now.
- Visited Hohai University's Civil Engineering Department. This is the first university I've seen with really modern stuff on par with the lab. GIS was very much in evidence us.
- Also visited the National Committee for Relocation which is located on the university and had some interesting discussions with them (since it was unofficial).



May 31, 2000
Nanjing

- Was supposed to have talks with their students and staff. Ended up a law discussion. A bunch of hydraulic graduate students who are going to Delft took some of us to play table tennis. Oh yeah, this is the first place where students want to go somewhere other than the USA.
- The students took us to Fu-Tze Miao. (Confucious Square). A shopping (pedestrian) mall literally built around a temple of Confucious. Temple was interesting but none of us was going to pay to photograph inside so only outdoor shots exist. Came back with a huge amount of shopping stuff.



00 5 31



June 1, 2000

Nanjing Tour

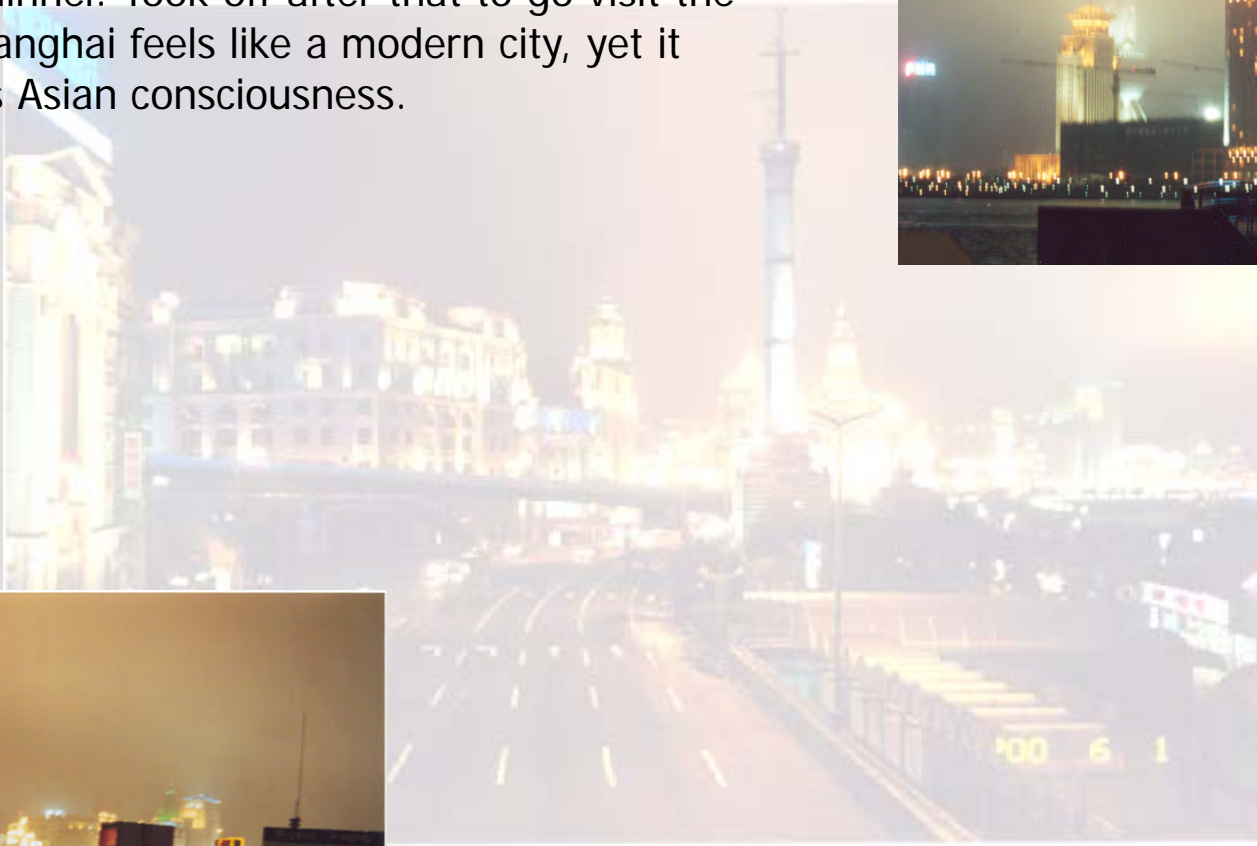
- The morning was a tour of Nanjing's sites. Ended up at Sun-Yat-Sen's Mausoleum. The only person honored by both governments and the Japanese. This is one of the few places left untouched.
- Managed to go to the Ming Park and also to a freshwater pearl farm. Squeezed all that in before our train left for Shanghai.



June 1, 2000

Shanghai Night

- Arrived in Shanghai on a fast train (100 mph) in time for dinner. Took off after that to go visit the Bund. Shanghai feels like a modern city, yet it retains its Asian consciousness.



June 2, 2000
Shanghai Day off

- Complete day off. But our good friend, the rain caught up with us. Despite all that, visited Nanjing Road, Pudong Communication Tower which gave a fantastic view of the smog ☺. Cosmopolitan? Shanghai is it!



June 3, 2000

Shanghai-Pudong Chai Chien

- With a heavy heart, both from coming out of China and also because this journey is at an end we finally leave China. Lose Prof. Zhang who has been great especially for those Fernando.
- Leave Pudong for Narita (get upgraded to Business class, Hah!). Lose Cat and Bob there. Then on to O' Hare for the rest of us.
- When we arrive after 13 hours, find out that there are no pilots to take us home. At the last minute, all comes right. And we arrive almost at the exact time in Cedar Rapids.
- Iowa I am here again!



Thoughts of the Three Gorges Project

- Having come through all the discussions, I must make some comments on what I've seen and been through.
- Is the TGP viable/sensible?
 - In a lot of ways it is. It represents a way to raise flood protection to 1 in a 100 year frequency for normal unprotected areas (presently 1 in 10) and a 1 in a 1000 year frequency for protected areas. Presently most areas downstream of the TGP rely on Dongting Lake. However this lake will be affected by the dam. The level of the waters downstream of the TGP are expected to be lower, thus, negating the effect of this lake.
 - It provides a huge amount of power. Some protest too much power. But is there such a thing? Not in a developing country. Only a developed country can afford to say that.
 - The human cost? To quote the Chinese, 1 million people are affected by moving but 100 million people downstream are affected almost yearly by floods. In very few other countries can it be said that the human costs of 1 million people can pale in comparison to any other cost. Yet here it does.



Thoughts of the Three Gorges Project

- But is it all good?
 - No.
 - Based on the problems the Chinese government is having with corruption and the recently reported corruption trials, there must be some concern on the following
 - Quality of workmanship in the construction
 - Disappearance of resettlement funds.
 - One major problem is the pollution of the Chang Jiang (Yangtze) itself presently. I've seen dirty rivers, but this one almost takes the cake. The dam's completion will mean a tremendous amount of water will not be flowing.
 - Sediment is another factor; what the Chinese quote Prof. Kennedy as having said "The dragon that will make or break the project". They use 1-D numerical models and have only used 2 and 3-D models at very important areas and right at the dam, as well as numerous physical models which are spread around the country. Additionally they are also basing their judgment on the present operation of the Gezhou Ba as well as a rebuilt dam on the Huang He. This is where the "Store clear, release turbid" rules come from. If they are right, they lose 15% of the dam's capacity in 150 years and no more. If they are wrong, who knows... previous Chinese dams have lost 100% of their capacity.
- The Chinese are taking a gamble, as we always have. This one though will make or break them. Good fortune to them.



Thoughts of the Three Gorges Project



Appendix I

TGP Numbers

Table. 1 List of Principal Indices of the Project

Item Description	Unit	Index
1. Reservoir		
NPL	m	175 (156m in the initial stage)
FCL	m	145 (135m in the initial stage)
DCL	m	155 (140m in the initial stage)
Designed Flood Level	m	175
Check Flood Level	m	180.4
Total storage capacity	10^9m^3	39.3
Flood control capacity	10^9m^3	22.15
Surface area	km^2	1,084
2. Dam		
Type		Concrete gravity
Crest elevation	m	185
Max. height	m	175
Length of the axis	m	2309.47
3. Power Station		
Type		dam – toe powerhouse
Installed capacity	MW	18,200
Guaranteed output	MW	4,990 (3600 in initial stage)
Ave. power generation	TW·h	84.68 (70 in initial stage)
Unit capacity	MW	700
Number of units	set	26



Appendix I

TGP Numbers

4. Shiplock Type Dimension of chamber	m	double way 5 stage 280 × 34 × 5	
5. Shiplift Type Dimension of container	m	one way, 1 stage 120 × 18 × 3.5	
6. Reservoir inundation Farm land(including orchard) Population	10 ³ ha 10 ³	24.5 844.1	(based on 1992 survey) (based on 1992 survey)
7. Construction Earth & rock excavation Earth & rock embankment Concrete placement Re – bar Metal works Total construction duration 1st batch of units commissioning	10 ⁶ m ³ 10 ⁶ m ³ 10 ⁶ m ³ 10 ³ t 10 ³ t year year	102.83 31.98 27.94 463 256.5 17 11th	
8. Total static estimate Project Inundation compensation	10 ⁹ Yuan 10 ⁹ Yuan 10 ⁹ Yuan	90.09 50.09 40	(1993 price level) (1993 price level) (1993 price level)