Journey into Northern China
Impressions of a scientist

By Farouk El-Baz

Our flight arrived at Beijing airport shortly after 2 p.m. on July 27, 1979. It was hot and uncomfortably humid. Although we were cordially met by Professor Hwang Pingwei, Director of the Institute of Geography of the Academia Sinica and his staff, there was chaos during what felt like endless delays in entry formalities.

Strangely enough, the chaotic setting was soothing and reassuring. This had been my first visit to China. What I expected was a somber, regimented and coldly serious setting as that felt upon entry to the Soviet Union, the other giant of the Eastern Bloc. Far from it. Chinese travelers and officials alike smiled and even joked about the cumbersome formalities. There was something inviting about the place.

We were in China on a scientific exchange sponsored by the National Geographic Society, which was represented by writer Richard Gore and photographer Bruce Dale. They were both charged with preparing an article on China's deserts for the National Geographic magazine. A group of accompanying experts included three arid land ecologists, a geographer, an archeologist and me, a geologist.

After settling in our quarters at the Friendship Hotel in a suburb of Beijing, we discussed our travel plans with Professor Zhao Sungzhiao, our companion and field guide. He epitomized the oriental character; a very gracious host, kind and polite, with unobtrusive shrewdness. He combined encyclopedic knowledge of China's geography with a flavor of culture and history. His energy, zeal and interest made him a wonderful travelling companion.

Before we started our journey westward, we had the opportunity to visit some of Beijing's learned institutions and lecture at the Peking Normal University. One had the feeling that our hosts were deeply concentrating on every word we said. They were eager to learn about the new methodologies of American science. They were not shy to admit that they needed 'updating,' but very careful to point out their accomplishments under tough conditions of the recent past. One could sense the atmosphere of renewal in the air. After the deterioration during the rule of 'The Gang of Four,' research was about to enter a new era: 'The Spring of Science.'

I thought about this statement as I passed the Great Wall, an hour and a half drive from Beijing. How many upheavals and 'springs' of science did this gigantic structure witness? It stood as an indisputable reminder of China's ancient grandeur. Where I measured, it was 24 feet high and 16 feet in width, and its towers reached for the sky on top of the jagged mountains.

It was not the enormous structure with its snake-like passages along the ridges and peaks that impressed me most. The ruggedness of the terrain and the sturdiness of those who have conquered it captured my thoughts. I stood in one of the tower windows and imagined invading Mongols from the north. The forbidding slopes and rocky passages of the Jundi Shan range would defy a modern army with all its technological might.

I also pondered the ingenuity of the Chinese artists of the past, who transformed the roughness of the terrain into forms of great serenity in their paintings. As I stood on the wall I was able to appreciate the origins of the superior landscape of ancient Chinese painters. The terrain unfolded layers upon layers of mountain profiles; the closest appeared sharp and crisp and the farthest dissolved in the fine mist and into the sky.
It was time to depart on train 43, the Beijing-Lanzhou Express. To fellow Chinese travelers our luggage was a sight to behold, particularly the dozen shiny aluminum cases that contained the elaborate photographic equipment. Travel by train in China was more than pleasant. We had comfortable sleeper compartments, good food, and excellent service. Thermos bottles were always kept filled with boiling hot water for tea, which was kept in colorful tin cans. Passersby in the train cars were always friendly, stopping to greet those who spoke Chinese and those who did not.

The best aspect of train travel was the opportunity to continuously monitor the changing scene. The train headed northwest of Beijing through the ranges of Xionger Shan and Damaquin Shan. The railroad then turned west through the mountain ranges and open plains of Inner Mongolia, where we had a glimpse of the 'gobi.' Here we learned that gobi was not a place name but a type of desert; a rocky surface covered with pebbles and cobbles, some deposited by water action and others left over by the eroding action of wind. The term 'shamo' explained the other desert type, with sand sheets and sand dunes. Thus, we encountered gobi and shamo in many places in China.

Loess was the other most prevalent terrain type we observed in northeastern China. The term came from the German word meaning loose or unconsolidated. The Chinese loess lands were formed by accumulations of wind-borne dust, mainly siliceous, from the deserts of Mongolia to the northwest. From the train window I watched the deep gullying of this soft sediment by tributaries of the Yellow River. The river water took on the buff-yellow color of the surrounding plains.

The scene imprinted in my thoughts another living proof of the powers of natural forces to alter the landscape of this planet. The rock from which the loess particles were eroded was probably crushed under the weight of ice glaciers in Mongolia and farther north. The particles were hurled by winds for 800 miles or more to accumulate in layers. Rain water and the Yellow River system carved slices out of the loess land some of which came only to rest as a newly-formed ocean sediment after the river waters entered the East China Sea.

Our first stop was at Zhongwei in the south central part of the largely Hui (Moslem) province of Ningxia Autonomous Region. The small town had rarely seen visitors, not to mention Americans. It appeared as if the whole population came to greet us — and take a look. People had no qualms about taking a very close look at us, such a strange breed. I think what bothered them most was the fact that we all looked so very different. In our group of eight there were two over six feet tall, one heavy-set, some short, some dark-toned, others blond, and so went the list. If any of those who closely examined us were asked, "What do Americans look like?" they would not have been able to give a simple answer.

We came to Zhongwei to visit Shapotu, 14 miles to the west. Here we were to see a place of which our field guide was very proud. It was 20 years ago that a railroad track had to be placed in the midst of shifting dunes in the southern part of the Tengger Shamo. The rocky ground to the south was earthquake-ridden and declared unsafe for the railroad. Thus the dunes had to be stabilized. It was a major feat and was done in the traditional, labor-intensive Chinese way.

During two years, mountains of sand had to be leveled to make a path through the dunes for more than 15 miles. Then, for nearly 1,000 feet on either side of the rail, grid lines of soil were laid on the sand exactly three feet apart. Hay and grass seedlings were placed on the soil lines and pushed into the sand by shovels. The result was a grid of untold numbers of fences separating areas of sand three feet square. Rather than try to defy the whole of the wind energy, the sand was allowed to move about, but within small, confined and contiguous squares. What ingenuity! I stood atop a high dune and for as far as I could see, the site looked as if a mythical giant placed a huge fishnet that held the dunes in place.

From Zhongwei we boarded the train for Lanzhou for more discussions and lectures at the Lanzhou Institute of Desert Research. The director, Professor Zhu Zhenda, had traveled widely in the North African Sahara and the
two of us had similar experiences and several friends in common there. He shared with me the results of eight years of research on the Takla Makan Desert. He explained on maps how its unique pyramid dunes were produced by two opposing winds from the northeast and northwest, and welcomed my suggestion for a journey through this fabled desert on a future visit.

The air of Lanzhou was choked by industrial pollutants from the numerous factories. The city and its suburbs, confined along the very narrow banks of the Yellow River for 40 miles, were bounded by mountains on the north and south. Thus, we were happy to get on the train for the rest of the journey northwestward through the historic Hoxi Corridor. Our next destination was Jiayuguan, the last, westernmost point of the Great Wall.

Yang Youlin, the young interpreter that helped us at Lanzhou called along. He was a Hui and made sure that the train's cook knew this. A special table was set for the two of us in the dining car with a sign that said 'Moslem Food,' meaning pork-free. Although the young man knew little of Islam, he was quite zealous and wanted to learn more. Religious practices were curtailed if not prohibited in most of China during the reign of 'The Gang of Four,' and he wanted to enjoy the new-found freedoms in modern China. He was moved by every word I taught him in Arabic, the language of the Qur'an.

From Wuwei to Lanzhou, the train straddled the Hoxi Corridor between the Longshou Shan and Hel Shan in the north and the Lenglong Ling and Zoeland Nanshan in the south. The mountain slopes unfolded an eye-pleasing panorama of China's countryside. Piles of hay neatly packed in conical shapes marked the grain harvest. Fields of mustard plants exploded with brilliant color. Terraced slopes were being worked by individual farmers and groups of workers from nearby villages, and grazing animals roamed the terrain.

Early in the morning we traveled by car from Lanzhou to Jiayuguan at the end of the Great Wall. The fortress stood in a magical blend of grace and majesty. This was once the last outpost of safety along the ancient Silk Road. Up to this point traders received the protection of the Imperial Guard. Beyond it only demons and raiders roamed the terrain. The magnificence of the place captured us and Bruce Dale and I decided to spend the rest of the day exploring its vicinity and watching the sunset behind its walls.

The fortress was surrounded by a gobi plain. Studying the base of the walls convinced me that this particular gobi surface was depositional in origin. Beneath the wall were layers of pebbly deposits that suggested various episodes of deposition by flood waters from the nearby mountains. The part of the Great Wall that lead to the fortress was much less majestic than what we saw near Beijing. It was reduced to an eight-foot high, 24-inch wide mud wall. One break in the distance marked a passageway for a camel herd, and the second farther away for the passage of the train.

Camels were plentiful in the area of the fortress. Only once in a long while did we encounter humans. The high walls of the fortress surrounded high passageways leading to the residences for the generals, tax collectors and lesser administrators of the past. One could guess the position of the resident in the hierarchy by the decorations on the doors. The entrance to the general's place was adorned by exquisitely-painted figures on either side of the door.

At sunset, a jeep came to fetch us for return to Suzhou. We hated leaving Jiayuguan especially after learning that we could no longer travel to Dunhuang at the northwest corner of Gansu Province, where we wanted to see the Caves of a Thousand Buddhas. Rainfall had been unusually high that season, causing floods which severed the railroad. Instead we went back by train to Lanzhou for more scientific discussions, lectures and bad air.

It had been only two weeks since our arrival in Beijing yet we were accustomed to Chinese food and had become experts in using chopsticks. We competed in taking oily, small, roasted peanuts in the brown skin by chopsticks from someone else's chopsticks. We often wondered how we would behave with knives and forks once we returned to our more usual style of life. China was already in our blood.
and we all attempted to use our limited newly-learned Chinese. This behavior was a reminder of the fact of history that the Chinese always managed to absorb all invaders and dissolve their culture into their own.

After a few days at Lanzhou, we embarked on a propeller craft that flew us to Urumqi. We used this capital city of one million people as a base during our ten-day stay in the Xinjiang Uygur Autonomous Region. Xinjiang is the largest of the Chinese provinces with an area of 660,000 square miles. Because it commanded nearly all the passages of the ancient Silk Road, it had a colorful history. It first passed under Chinese rule in the first century B.C., under the reign of the emperor Wu Ti. In the second century A.D., China lost Xinjiang to the Uzbeks, and then recaptured it in the mid-seventh century. The Tibetans conquered it a century later and they were overrun by the Uyghurs, who were invaded by the Arabs in the tenth century. The domination passed hands to the Mongols in the thirteenth century, until the Manchus established loose control over Xinjiang in 1756.

Xinjiang’s more recent history is no less tumultuous. Its relationship with China was marked with cultural and religious conflicts until it finally became a province in 1881, with considerable autonomy. Uprisings in the 1930s and 1940s further eased China’s control, until Xinjiang capitulated in 1949.

With the Uyghurs making up over two-thirds of the population it was given its present name in 1955. By the time we visited Xinjiang in 1979, the population was more than half Chinese. A massive infusion of Han Chinese was imported into Xinjiang for four good reasons: to alleviate population pressure in the east, to work in land reclamation projects, to develop the mineral and petroleum resources, and above all to protect the 1,800-mile border with the Soviet Union.

Our first excursion in Xinjiang was to the Turpan Oasis, some 150 miles southeast of Urumqi across the Tian Shan. Half way to the depression that enclosed the oasis, the road was cut by flood water and a 20-foot wide, 30-foot deep hole slowed our advance. The rest of the road was treacherous. Our drivers negotiated the rough terrain and steep slopes with confidence. They were indeed very good drivers, mechanics and guides. The dust, hurled into the air by the vehicles, choked us and made its way into all our belongings including cameras that were protected by plastic bags. This reminded me of travel in the Western Desert of Egypt, where in places the surface is covered with an extremely fine rock powder.

The setting of Turpan was reminiscent of a Saharan oasis; a harsh uninviting environment surrounded a serene life. Before reaching Turpan we drove through a barren stretch of gobi. The pebbles were not coated with the dark and shiny ‘desert varnish’ as in other gobi plains, which indicated that it was a young surface that kept overturning by water action. The fact that water acted on the surface was also proven in another way. Telephone lines connecting Urumqi and Turpan were elevated one foot above ground by stands of cement. The poplar tree wood used for the poles, rotted easily when soaked with water.

The gobi surface that separated Turpan from the foothills of the Tian Shan was pockmarked with circular mounds surrounding deep holes. These gave the place an eerie, moonlike appearance. The man-made pits marked the innumerable lines of Qariz or underground channels carved into rock to bring rain and snowmelt water from the mountains to the fertile land in the depression. Gravity assisted much in the flow of water; the mountain peaks due north of Turpan rose over 14,000 feet high and the lowest point in the depression sank over 500 feet below sea level.

Turpan is famous for its fragrant grapes which were shipped as far as Hong Kong and Japan. I sat under the grape arbor in the huge open courtyard of the guesthouse at Turpan and imagined the place a thousand years ago. Perhaps there was little difference. I was there as a scientist seeking knowledge from far away lands. From its earliest beginnings Turpan was a haven for merchants, traders, soldiers and diplomats. As in the past, travelers came and went changing Turpan little or not at all. The friendly, easy-going nature of the population proved this. Also, Riym Tokhtie, our local guide,
The effects of fierce wind erosion were quite obvious in the rock exposures in the Turpan depression. I studied wind-eroded landforms in the limestone rock that resembled inverted boat hulls. Such a form was called Yardang from a Mongolian word as Sven Hedin related after his journey through the Lop Nur region, 150 miles south of Turpan.

From Turpan we returned to Urumqi for lectures and discussions with local scientists. We also had an opportunity to roam in the city with its broad streets and wide squares decorated with bright red signs praising the Communist Party and its accomplishments. Urumqi was unique among the cities we visited in the abundance of mosques. One Imam told me that there were 20 in the city. The Imams lead prayers reciting passages from the Quran in flawless classical Arabic.

The land reclamation projects of the Manas River Valley were our next objective in Xinjiang. This part of the Dzungarian basin was selected for massive land reclamation from the sandy desert called Gurbantunggut Shamo. Here barchan dunes and complex dune forms gave way to intensive agriculture by the Han. At ‘State Farm 150’ all the Chinese we met had come from either the northeast or southeast, particularly from Shanghai. Wherever we went we were treated to succulent ‘Hami’ melons and refreshing tea.

The night of August 11 we chose to spend out in the open. Bruce Dale wanted to photograph the expected meteor shower that night. Four of us drove 15 miles into the desert and selected a longitudinal dune to host us for the night. In the early evening the moonlight was lovely and as the moon disappeared the sky exploded with stars. Meteors streaked through the speckled darkness.

Our last objective in Xinjiang was to visit the grazing lands on the slopes of Tian Shan. We drove 40 miles southeast of Urumqi and roamed among the Kazakhs and their yurts. Like the Uyghurs, the Kazakhs were also friendly and generous. The men and boys lead the herds of grazing animals up the slopes leaving the women and girls to mind the yurts. The latter job was not as easy as it seems. In this wilderness everything had to be done from scratch. Nothing was purchased and all had to be done by hand, including structural repairs to the dwellings.

On a lonely slope, I encountered a girl who could not have been ten years old. She had a younger brother to care for, cut the firewood with an ax that was taller than she, and heated cow milk for her brother, while she explained to me that both her parents had to mind their herd of horses and might not return for a month or more. Her explanations were in a language that I did not speak, but her hand language was graphic. She offered me milk and dried cheese. After I gave her all the candy, gum and granola bars I had, I left the place filled with admiration for the young Kazakh.

Incidents like that made our journey into northern China a most memorable one. During our month-long visit we saw innumerable types of terrain, a great variety of people and places, and were impressed by the stamina of the Chinese. We returned from Urumqi to Beijing by jet retracing our tracks with modern-day speed. In my mind I retraced those tracks with admiration for this great country that is rich in history and culture, and above all rich in its people.
Their first experience with instant photographs of themselves amazes Kazakh women and children.

Light drizzle does not discourage Chinese tourists who pace the Great Wall built by their forefathers.

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Dr. El-Baz taught geology at the Universities of Assiut, Egypt (1958-1960), Missouri at Rolla (1963-1964), and Heidelberg, Germany (1964-65). In 1966 he was exploring for oil in the Gulf of Suez, with the Exploration Department of Pan American-UAR Oil Company before joining the Bell System in 1967.