
Chapter 4

Central Asia

Central Asia occupies a pivotal position in the orographic structure of the continent. It is from this highland core that mountain chains diverge to the west, north-east, and south-east. The main physiographic units of the region are extensive plateaus and depressions ringed by high ranges. This highland complex is described below in seven components: the Tibetan plateau (Plate 9), Hengduan, Kun Lun, Pamir, Tien Shan, Altai, and Urals (Figures 3 and 4 and Annex C).

4.1 The Tibetan Plateau

The plateau of Tibet, roof of the world, owes its extreme elevation to tectonic uplift as a result of the collision of the Gondwana plate with the Angara plate. The land surface slopes towards the south-east with an average elevation of 5,000m. The plateau extends 2,600 km from west to east and is about half as wide from north to south. It is rimmed by high ranges in the south (Himalaya), west (Karakoram), and north (Kun Lun). In the east, the barrier is one of multiple ranges with deep gorges. Much of the interior is a tangled wilderness of mountains and plateaus interspersed with numerous lakes. One authority, Pierre Gourou, in his book *L'Asie*, claimed that there were 36 different mountain ranges in Tibet alone.

The structural strikes and thrusts on the plateau are mainly east-west oriented with a north-west loop in the west and a south loop in the east. The alignment of major relief features conforms to such a pattern. This is most evident from the long trench of the Indus-Brahmaputra which demarcates the Trans-Himalaya in Tibet from the Main Himalaya to the south. The parallel ranges of Nganglong and Gangdise in the west are a structural extension of the Karakoram and Ladakh Ranges. The high points are the Alung Kangri (6,450m) in the Nganglong and the famous Kailash/Kang Rimpoche (6,660m) in the Gangdise Range. The highest peak of all in the area is the Gurla Mandhata (7,739m) which lies south of Kailash across the Manasarovar Lake. The Gangdise Range forms the watershed between the continental plateau and the Indian Ocean drainage systems.

The Gangdise continues as an emphatic range as far as the longitude 90°E. Further north, the Tanggula Range is aligned east-west, traversing the vast expanse of the Changthang (Northern Plain). It has some peaks approaching 6,900m. The Nyaingentanglha Range, north-east of Lhasa, is much dissected and rugged. Its spurs are linked to the Tanggula in the north and the Hengduan towards the east. The highest point, Namjubarwa (7,353m), lies about 200 km north-west of the

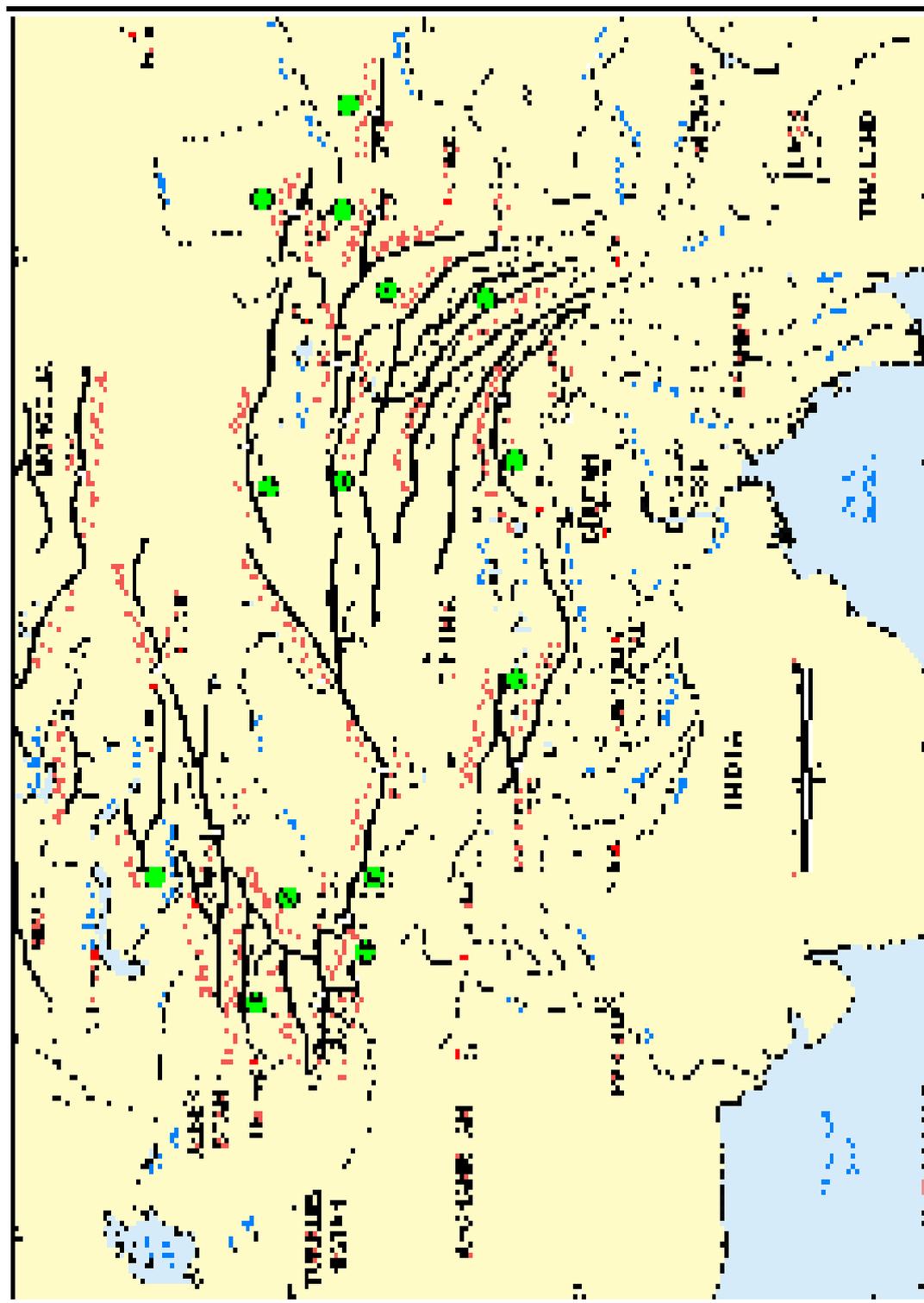


Figure 3: Central Asia (A)

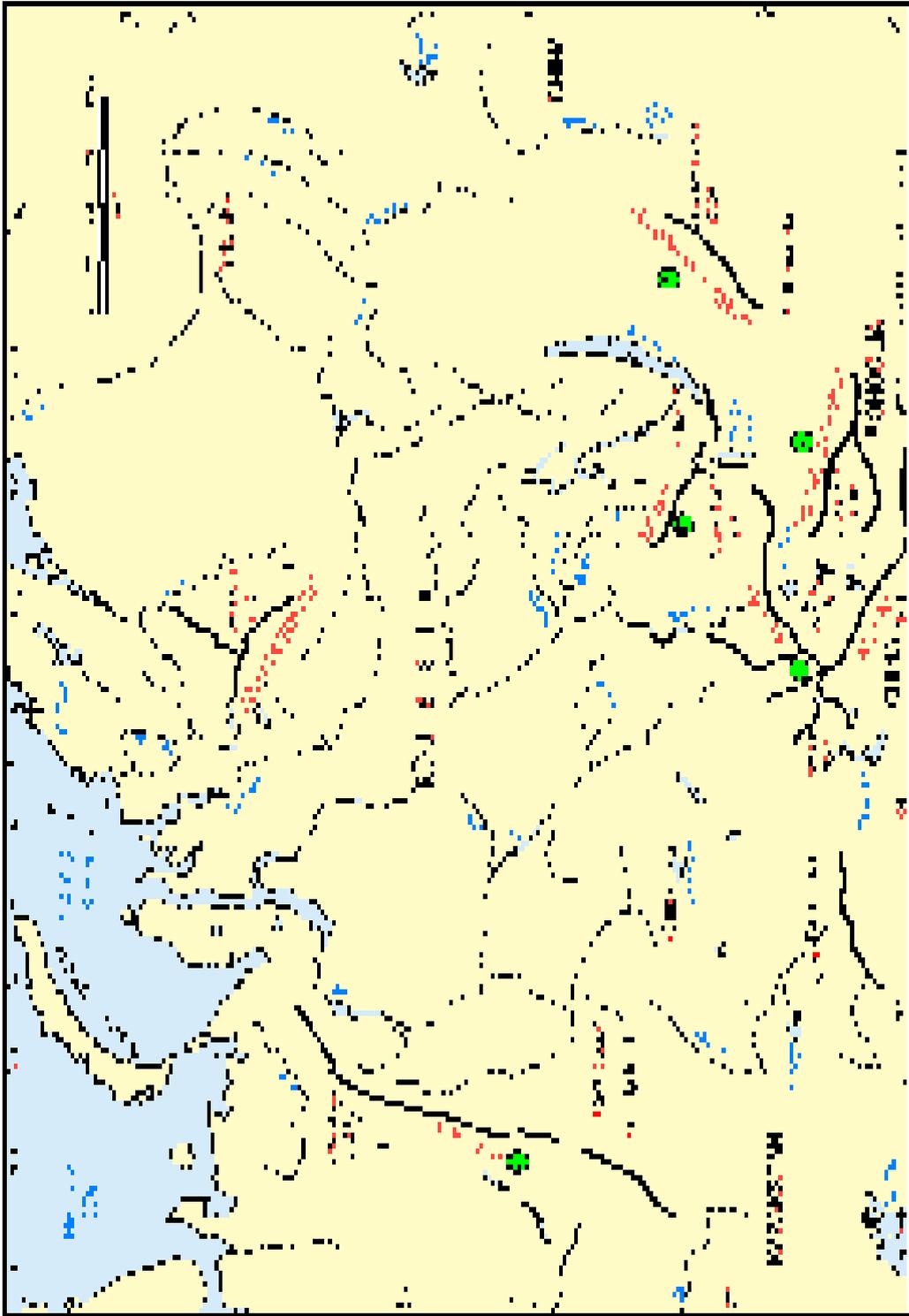


Figure 4: Central Asia (B)



9. **Environs of Lhasa, Tibet.** The wide valley is drained left to right by the Kyi Chu of the two hillocks on the plain, the left one is crowned by Potala palace between the old town (middle distance) and new complex (foreground). The western hillock, Choghuri, had a medical university in the old days.

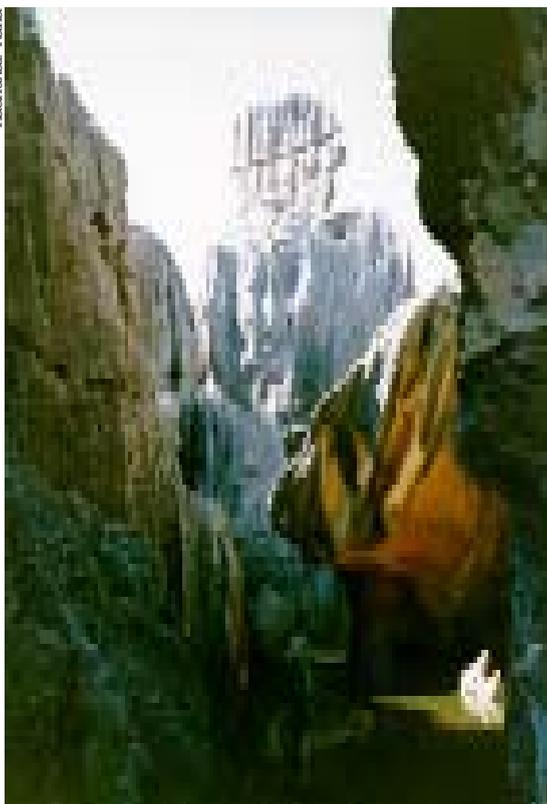
Tsangpo-Dihang bend. Namchabarwa massif's south side is fully exposed to the monsoon regime, with an annual mean precipitation of 2,276mm, while the north side only receives 510mm. Thus, the south has nine forest zones compared to only six in the north (Peng et al. 1997). Further east, there are three parallel ranges aligned north-west/south-east. These are the Ning Ling at the head of the Mekong River, the Bayan Har at the head of the Yangtze River, and the Anyemaqen at the head of the Huang He. The last range also marks the boundary between the Tibetan plateau and the Qaidam basin. It extends east through the rugged Min Shan which has two branches. One branch trends south as the Qionglai Shan and another farther east as the Daba Shan. The average elevation of the former is 2,500m and that of the latter above 2,000m.

The desert climate situation of the western section of the plateau supports only nomadic pastoralism. The chief population centres are in the south-east, mainly along the Tsangpo and valleys further east. The encapsulation of the harsh physical environment led to the evolution of social mechanisms such as fraternal polyandry that

prevented land fragmentation and decreased aggregate fertility (Goldstein 1981). Yet it was this remote plateau that spawned Lamaism, a form of tantric Buddhism, that radiated far and wide, including Mongolia. Therefore, while other mountain people are referred to as cultural groups, the Tibetans are associated with a civilisation that is basically mountain-based.

4.2 Hengduan

The Hengduan Mountains constitute a series of ranges that descend east from the Tibetan plateau to form the highlands of Sichuan (Four Rivers) and Yunnan (South of the Clouds) (see Plate 10). Although the area is physiographically linked to Central Asia, its environment and economy are more akin to those of the sub-tropical highlands of South-East Asia. The Hengduan Mountain Ranges represent a truly rugged terrain, but there is no complexity to their configuration. Basically, they are north-south aligned parallel ranges, alternating with deep gorges that block east-west travel, hence the name Hengduan which means 'cut across' in Chinese (Chung 1978, p42). They are also sometimes referred to



10. In the Stone Forest, Yunnan Province

as Transverse Mountains and as River Gorge Country. The first range, Gaoligong, between the Irrawady and Salween rivers runs along the Myanmar-China boundary. The second range, the Tiantaweng with Moirigkawa Garbo (6,809m), lies between the Salween and Mekong. The third, Ningjing-Yun Ling, separates the gorges of Mekong and Yangtze (Jinsha Jiang). East of the Yangtze, the ranges of the Shaluli and Daxue on either side of the Jiang River are fairly extensive. Altitudes vary from 2,000-2,500m in the south to 7,000m in the north. The highest peak, the Gongaa Shan/Minya Konka (7,556m), is in the Daxue Range. This range marks the transitional zone between the dry Tibetan plateau and the wet Sichuan basin. Limits of various ecological belts are 3,000m higher on the west side due to the mass-elevation effect of the Tibetan plateau (Thomas 1999). Large areas of primary deciduous and coniferous forest have been cleared

through commercial logging. The Shaluli Shan is marked by the spectacular Xia-qiao-tou (Tiger Leap Gorge) of the Yangtze around Yulongxue Shan/Jade Dragon Mountain (5,569m). The Hengduan area with its wide altitudinal range and heavy monsoon rain has very rich and varied flora and fauna. Extensive areas are under dense forest, varying in type by elevation and aspect and including as many as 550 species of medicinal plants. Timber logging has become an important economic activity. Cultivation is generally practised below 3,000m. The rotation cycle for swidden agriculture for maize and dry rice ranges from three to 12 years (Harris and Ma 1997). In the past, opium poppy cultivation was widespread. The area is home to numerous ethnic minorities with distinct languages and customs (Box 2). Some of the better known are the Bai, Dai, Jingpo, Lisu, Miao, Naxi, Lhoba and Yi. Of these, the Naxi have an ancient tradition of script-writing in pictograph form known as Dongba.

4.3 Kun Lun

Kun Lun, meaning 'the South', in the language of Hotan on the ancient Silk Road, extends 2,500 km from the Pamir to the Sichuan highlands. The main range, exceeding 6,000m, encloses the Tibetan plateau from the north. Its eastern extremity, Qin Ling, marks a climatic divide between the arid north and humid south. West of Qin Ling, the range system broadens to enclose the Qaidam basin in Qinghai with two ranges. The northern one, the Qilian Shan, continues west and converges on the main range as the Altun Shan. The southern one, between the Tibetan plateau and Qaidam basin, is represented by the Anyemaqen, Burhan Budai, and Ho Xil sections culminating in Muztag Feng (6,973m). It then extends west as a single range separating the Tibetan plateau to the south and the Tarim basin to the north. The highest peak in the range, Mount Kongur (7,649m), lies in Tibet. The Yarkand River that drains Sinkiang (The New Frontier) has its source south of the range, and it turns north around the mountain complex where the Kun Lun, Karakoram, and Pamir meet. The Kun Lun rises above desolate deserts, yet its glaciers and snows

Box 2

Mountains and Minorities in China



11. Tibetan Nomads

D. Miller

Nearly two-thirds of China's landmass of 9.6 million sq km is made up of mountains and plateaus of considerable elevation. These highlands, located mostly in interior border areas, are the habitat of 55 designated minority nationalities. Their total population of 91 million account for 8 per cent of China's national population. Of these, 18 ethnic groups exceed a population of a million each with the Zhuang being the largest. The majority of larger groups are sedentary farmers. Fifteen groups range from 100,000 to 700,000 in population size. Another 16 groups have a population of 10,000 to 100,000. The last six groups with populations of less than 10,000 are mainly shifting cultivators or herders (Plate 11).

The 55 minority nationalities represent eight language families. Fourteen nationalities with the Sino-Tibetan language family constitute the largest group with 37.4 per cent of the total minority population (Table below). They are localised mostly in the south-eastern region. The second largest population group, 16 with the Tibeto-Burman language family, are from the west and south. The Altaic group has 13 nationalities from the north-east, while the Turkic group has 6 nationalities from the north-west. The rest are Arabic and Slavonic from the north-west and Austro-Asiatic from the south.

Table : Language Group of Nationalities

<u>S.No.</u>	<u>Family</u>	<u>Nationalities</u>	<u>Population</u>	<u>Per Cent</u>
1.	Altaic	13	17,467,111	19.2
2.	Arabic	1	8,602,978	9.5
3.	Austronesian	1	400,000	0.4
4.	Austro-Asiatic	3	449,716	0.5
5.	Sino-Tibetan	14	33,899,379	37.4
6.	Slavonic	1	13,504	0.0
7.	Tibeto-Burman	16	21,400,393	23.4
8.	Turkic	6	8,517,636	9.4
Total		55	90,750,717	100.0

In regional distribution, the highlands of Sichuan, Tibet, and Yunnan converging on the Hengduan Ranges have a concentration of 22 national minorities. Ethnic diversity is most pronounced in Yunnan province from whence ethnic group have also spilled-over into Myanmar, Thailand, Laos, and the highlands of Vietnam. These are mostly of Sino-Tibetan and Tibeto-Burman language groups. Xinkiang with the Altai, Pamir, and Tien Shan Ranges and Gansu with the Qin Ling Shan in the north-west have 14 nationalities. The majority of

these belong to the Turkic language group. The southern hills of Guizhou, Guangxi, and Kiangsi include 12 nationalities of the Sino-Tibetan and Austro-Asiatic language groups. Inner Mongolia and Heilungkiang across the Great Khingan are the home of seven nationalities that belong to the Altaic language group.

The livelihood pattern of national minorities has evolved according to the resource base of their habitat. These are predominantly livestock herding in the north, shifting cultivation in the south-west, and sedentary agriculture in the south. In the latter region, rice is the main crop with tea growing among nationalities such as the Blang, De'ang, Hani, Jinuo, and She. Other specialist groups are the Doxiang, Jingpo, Salar, and Uygur in horticulture and the Hui and Tartar in trade.

Source: Appendix II

feed several major rivers such as the Huang He, the Mekong, and the Yangtze. The climate is arid with mean annual precipitation ranging from 30-60mm to 100-300mm on higher slopes. The general pattern of land use is oasis agriculture below 1,500 m, farming and winter grazing at 2,000-3,000 m, and summer grazing at 3,000-4,200m (Zhang 1995).

4.4 The Pamir

The name Pamir, or the *Bam-i-dunya* (Roof of the World) of Persian writers, is actually derived from the broad valleys in south-east Tadzhikistan, but

since has come to include all the mountains between the Amu Darya (Oxus) River and Alay Range. The Pamir knot is the convergence area of several high ranges. These include the Hindu Kush from the south-west, the Karakoram from the south-east, the Kun Lun from the east, and the Tien Shan from the north-east. Geologically rich and complex (Plate 12), the area's strike lines make a sharp arcuate facing north towards Ferghana. This high mountain complex between the Tarim and Karakum basins is inclined to the west and drained by the Amu Darya. Most of the area lies in Tadzhikistan but the highest summit, Muztag Ata (7,719m), is in a north-south range in China.



Pi teambur Shaema

12. A view of the mountains from Ala Archa National Park, west of Bishkek, Kyrgyzstan

Tadzhikistan is dominated by mountainous relief, as 61.5 per cent of its land surface exceeds 2,000m in elevation. These uplands support only 5.7 per cent of the country's total population due to the severity of the climate (Belkin 1992). The central part is in the form of an enclosed plateau where the Karakul Lake is situated. Westwards, parallel ranges trend towards the south-west. These also have numerous high peaks, of which Pik Kommunizma (7,495m) is prominent. Among these ranges, the Alayskiy Khrebet marks the northern limit of the Pamir. The area has extensive snowfields and many glaciers. The climate is cold and arid and vegetation sparse. The land is deeply dissected and also affected by intensive seismic processes. It is equally diverse in ethnic composition. The Tadzhik are early migrants from Persia, and they are mostly agriculturists. The Kazakh, Kyrgyz, Turkman, and Uzbek belong to later waves of Mongoloid herders of horses and sheep with their traditional central Asian yurts. The Tadzhik in the north-west are more sedentary and depend on irrigation for crops and fruit cultivation. The Kyrgyz are mostly nomadic and keep flocks of sheep, cattle, and yaks.

Under the Soviet regime, the Central Asian republics were much affected by centralized planning.

This not only involved a colonial type of exploitation of minerals and forest resources but also the organized migration of people (Badenkov 1990). This is evident from the composition of the populations of the Republics. Uzbekistan has a population that is 75 per cent Uzbek and ten per cent Tadzhik and Kazakh. In Kyrgyzstan, 58 per cent of the population is Kyrgyz followed by 14 per cent Uzbek, while Kazakhstan has 46 per cent Kazakh and the majority are from other groups. Since the transition from central planning to a market economy, there has been both increase in product diversity and revival of old traditions.

4.5 Tien Shan

The Tien Shan (Celestial Mountains) extends nearly 3,000 km from Kyrgyzstan, through Sinkiang, to the Mongolian frontier as a barrier between vast depressions. The range has more than thirty peaks approaching 6,000m or more. In contrast to the north arcuate structure of the neighbouring Pamir, strike lines of the Tien Shan are distinctly east-west oriented. This is expressed by a series of parallel ranges around the drainage of the Naryn River and the Issyk-Kul Lake (Plate 13) which, it is claimed, is the second largest mountain lake in the world. These western



13. Tornado over Issyk-Kul Lake, Kyrgyzstan

ranges, called Alai or Alay, average 4,600m in altitude and enclose numerous inland lakes. East of the Issyk-Kul Lake, the range becomes narrower and reaches the highest point on Tomur Feng (7,435m). Continuing east, a southern spur separates the Tarim and Turfan depressions, while the main eastern range separates the deserts of Turfan and Dzungaria. The Bogda Feng (5,570m) in the latter range, due north of Turfan Pendi, lies 154 masl. West of Turfan, a subsidiary range, the Borohoro Shan, trends north-west to join Dzungarkij Alatan on the Kazakhstan border. The Tien Shan is a land of extremes in terms of temperature range. The ranges average from 3,000 - 5,000 masl and the northern slopes are exposed to air currents from the Arctic Ocean and are moister than the southern ones. The Kazakh and Kyrgyz inhabitants are pastoralists with large herds of animals, mainly of horses, yaks, sheep, and goats. Since the abandonment of state farms that emphasised large herds, animal stocks in the Kyrgyz Republic have declined from 18 million in 1989 to 14 million in 1994 (Wilson 1997). The region is important for mining copper, gold, lead, antimony, and tungsten. Gas, oil, and hydropower are important energy resources of these mountain republics.

4.6 Altai

Altai or the Altay Range is a long chain traversing the borders of Russia, Kazakhstan, China, and Mongolia. They are fault block mountains trending south-east with their steep fronts facing south-east. The highest point, Mount Belukha (4,506m), lies to the north in the headwaters of the Ob and Irtysh rivers in Russia. The ranges generally exceed 3,000m in elevation and descend towards the south-east in Mongolia. The north-western part receiving heavy precipitation has rich coniferous forests. The lower easterly ranges have extensive grasslands. The Altai extends nearly 1,600 km in west Mongolia as the highest elevations in the country. In central Mongolia, the Changajn (Hangayn) Range runs 800 km parallel to the Altai. The third range, the Chentejn

or Hantiyn, is aligned south-west/north-east between Ulanbaatar and the Russian border. A subsidiary range of the Altai trends east of Mt. Belukha along the northern border of Mongolia. North of the Uvs lake, it is referred to as the Tannu Ola Range. The most easterly extension of the Altai is the Sayan Range between the Yenisey River and Baikal Lake. It commences with a northerly bend and then turns south to the Mongolian border. The Kazakh, west of the Altai, and Mongol to the east are nomadic herders raising horses, camels, sheep, and goats. For most, mobile herding is an entire culture and way of life (Goldstein and Beal 1994). Since the growing season is short due to extreme cold, herders keep their flocks alive on 'senescent vegetation' for nearly eight months of the year. Apart from livestock, Mongolia's major economic resources come from mineral exploitation.

4.7 The Urals

The Ural Range extends about 2,400km from the Arctic Ocean in the north to the plains of Kazakhstan in the south. It is a remnant of old mountains with the highest point, Gora Norodnaya (1,894m), in the extreme north. Despite its mature and rounded topography, the Urals stands out as a distinct feature amidst the surrounding lowlands and form a physical boundary between Asia and Europe. The range can be considered in three sections. The northern section beyond 61° north is narrow and craggy with a sub-polar climate. Reindeer herding is an important economic activity, while the leading industries are forestry and timber products. The central section, between 51° and 61° N is very low and well forested. However, mining is the most important industry in the area. The southern section has three parallel chains divided by intramontane basins. Woodlands constitute an extensive part of the area. The main occupations are agriculture and specialisation in horse-breeding and apiculture. The aboriginal population are the Khanty and Mansi in the north and the Bashkir in the south.

(see Figures 3 & 4)

Annex C : Ranges of Central Asia			
S.N.	Range (Subsidiary)	Prominent Peak (Metres)	Location
1.	Altai/Altay	Mt. Belukha (4,506)	Russia
2.	Anyemaqen Shan	Magen Kangri (6,282)	China
3.	Bayan Har	- (5,490)	China
4.	Changajin Nuruu	Olton Tenger (4,031)	Mongolia
5.	Chentejn Nuruu	Asralt-chairchan (2,800)	China
6.	Daba Shan	- (2,798)	China
7.	Daxue Shan	Gongga S. (7,556)	China
8.	Gangdise Shan	Gurla Mandhata (7,739)	China
	(Nyanglong Kangri)	- (6,450)	China
9.	Helan Shan	- (3,577)	China/Pakistan
10.	Hengduan Shan	Moirikawgarbo (6,809)	China
11.	Kun Lun	Mt. Kongur (7,649)	China
	(Altun Shan,	(6,025)	China
	Burhan Budai,	(6,224)	China
	Ho Xil Shan)	(6,415)	China
12.	Min Shan	Xuebao Ding (5,614)	China
13.	Nyaingentanglha Shan	(7,353)	China
14.	Pamir:		
	(Alayskiy Khrebet,	Muztag Ata (7,546)	China
	Shakhdarinskig K.	(5,642)	Kyrgyzstan
	Yajgulemskiy K.	Pk. Karl Mark (6,723)	Tadzhikstan
	Zaalaskiy K.)	Pk. Kommunizm (7,495)	Tadzhikstan
15.	Qilian Shan	- (5,687)	China
16.	Qin Ling	Taibai S. (3,767)	China
17.	Sayan Khrebet	Munku Sardyk (3,491)	Mongolia/Russia
18.	Taihang Shang	Wutai S. (3,058)	China
19.	Talasskiy-Alatau	- (4,528)	Kyrgyzstan
20.	Tanggula Shan	Purog Kangri (6,929)	China
21.	Tien Shan	Tomur Fang (7,435)	China/Kyrgyzstan
	(Bogda Shan)	- (5,570)	
22.	Ural	Gora Narodnaya (1,894)	Russia

