ANNUAL SUMMARY, 1933.

PART B.

SNOWFALL.

Introduction.

This part contains a summary of the reports of snowfall in the mountain regions to the north and northwest of India. These reports are collected by the local officers from the local residents, headmen of villages or from travellers who have passed through the region and are then transmitted to this office.

The amount of snowfall is usually measured by finding the depth of undisturbed snow lying on the ground and such measurements are given in feet and inches. At places provided with raingauges the amount of snow collected in the gauge is melted and measured as rain and the amounts are given in inches and decimals of an inch.

Cold weather period, January and February.

I.—Persia.

No reports were received.

II.—Afghanistan.

Kabul.—Snow lay to a depth of one foot for nearly six weeks at the British Legation at Kabul. Snowfall in Afghanistan was heavier than usual during these months. The winter was much colder than in any of the three previous years.

III.—Baluchistan.

Quetta.—At Quetta light snow mixed with rain fell on four days in January and on three days in February. The winter snowfall in Baluchistan is reported to have been heavier than usual.

IV.—North-West Frontier Province.

(*a*) *Hazara.*—The snowfall both in January and February was above normal. The snow descended to an elevation of 3,000 ft. in January and rose to 4,000 ft. in February.

The following table gives the falls and accumulations recorded at the end of each month :—

Locality.	January.		February.	
	Falls.	Accumulations.	Falls.	Accumulations.
	Ft.	Ft.	Ft.	Ft.
Narang . . .	8½	3⅓	6½	3½
Paludran . . .	6½	2⅔	5½	2⅚
Kagan . . .	5	1⅓	3¼	½
Jared . . .	2¼	⅓	½	..
Malkandi . . .	1⅓	1½	¼	..
Sundigali . . .	15½	1	3½	1½
Jachha . . .	15	1	3	..
Thandiani . . .	5⅓	4	2½	3
Birangali . . .	3½	3½	1	½
Dungagali . . .	5	4	5	6

(*b*) *Dir, Swat and Chitral.*—No information was received.

(*c*) *Khyber Agency.* Snowfall in January and February was normal.

(*d*) *Kohat.*—Fort Lockhart had about 1½ ft. of snow in January and ½ ft. in February.

(*e*) *North Waziristan.* At Razmak snowfall in January amounted to a little over 7″ while in February it was ½″.

V. Kashmir.

(*a*) *Skardu.*—Snow fell at the station and on the neighbouring peaks on four days in January and seven days in February. The falls were below normal.

(*b*) *Dras.* Snowfalls were very frequent on the Zojila and Mushko passes and the adjacent mountains occurring on 21 days in January and on 16 days in February. The snowline descended as far as the populated villages. The accumulations at the passes were about 5 ft. at the end of January and 7 ft. at the end of February. Snowfall is reported to be below average in January and above it in February.

(*c*) *Srinagar.*—Light to moderate falls of snow were received in the main valley on 16 days in January and on 4 days in February. The snow accumulations on the Pir Panjal and Harmukh mountain ranges were moderate to heavy at the end of February.

(*d*) *Kargil.*—Snow fell on 12 days in January and on 9 days in February. On the Zojila pass snow lay to a depth of 7 ft. at the end of January and is estimated to be about 10 ft. at the end of February.

VI.—Punjab.

(*a*) *Murree.*—Snow fell four times in January and thrice in February at Murree and on the neighbouring peaks within a radius of about 8 miles. The total depth of snowfall at Murree was 4′—8″ during January and nearly a foot in February.

(*b*) *Kulu (Kangra District).*—In the Kangra District there were no falls during the season except on the high ranges of the Himalayas. In the Kulu sub-division there was sufficient snowfall above a height of 5,200 ft. in January and above 6,000 ft. in February.

(*c*) *Kilba (Simla District).*—Snow fell on 12 days in January and on 7 days in February. Snowfall was above normal,

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and the snow-line descended to the level of the Sutlej river (5,500 ft.).

VII.—United Provinces.

(*a*) *Almorah.*—The following tables give the falls and accumulations of snow for the two months :—

Actuals.

Locality.	Amounts of snow for January.	Amounts of snow for February.
	Ft.	Ft.
Biyans	8¼	11¾
Malla Darma	10	9½
Malla Danpur	6½	13

Accumulations.

Locality.	At the end of January.	At the end of February.
	Ft.	Ft.
Nuwo Pass	10	25
Lampia Pass	18	18
Lepu Pass	18	14

Snowfall was above normal in both the months and the accumulations were much above normal.

(*b*) *Garhwal.*—Snow fell on five days in each of the months, the amounts being 5 ft. in January and 2 ft. in February.

VIII.—Assam.

(*a*) *Kamrup.*—The following table gives the accumulations recorded at the end of each month :—

Locality.	January.	February.
	Ft. in.	Ft. in.
Chirkimla	4 6	6 0
Yongla	0 4	0 3
Changkhar	0 3	0 2
Pangkhar	0 1	0 ½
Thupkang	0 1	0 ½
Karila	0 6	0 4

(*b*) *Sadiya Frontier Tract.*—No snowfall was reported.

(*c*) *Baliapara Frontier Tract.*—Heavy falls of snow occurred in January on the Se La, Pankim La, Piri La and Jhum La, that on the Piri La being the heaviest for years.

The hot weather period, March to May.

I.—Persia.

No reports were received.

II.—Afghanistan.

Kabul.—Snow was reported in Khanabad in March. Snow remained on the well-known peaks until the end of May, which is much later than usual.

III.—Baluchistan.

Quetta.—The snow accumulations on the hills melted away quickly owing to the unusually heavy rains during the spring. The highest pass was free of snow by the 15th March, and by the 15th May there was little or no snow except in shaded crevices on most peaks in Baluchistan.

IV.—North-West Frontier Province.

(*a*) *Hazara.*—Snowfall was observed on the surrounding hills on 13 days in March and was above normal. At the end of the month accumulations existed only on the outer hills above 6,000 ft. No information was received regarding April and May.

(*b*) *Dir, Swat and Chitral.*—Accumulations at the end of the period on well-known passes and peaks were far above normal in all the regions. Passes opened three weeks later than usual.

(*c*) *Khyber Agency.*—Falls of snow continued later than usual and were above normal at Tirah and other high ranges. Snow accumulations on the peaks of the Safed Koh at the end of the period were more in comparison with most years, and passes remained closed longer than usual.

(*d*) *Kohat.*—A light snowfall is reported from Fort Lockhart in March.

(*e*) *North Waziristan.*—No falls were reported and no accumulation existed at the end of the period.

V.—Kashmir.

(*a*) *Skardu.*—Snow fell on three days in March. In April and May there were no falls. The depth of snow on well-known passes was about 3 ft. at the end of the period.

(*b*) *Dras.*—Moderate snowfall occurred on 14 days in March, 11 days in April and 4 days in May on the passes and neighbouring mountains. The snowfall was above normal in March and April and below it in May. On the Mushko and Zojila passes the accumulations at the end of March were 15 and 20 ft. respectively. At the end of April they were about 12 ft. and had decreased to 6 ft. by the end of May.

(*c*) *Srinagar.*—Fresh light falls of snow were received in the main valley on two days in March, while moderate to heavy falls occurred on several days during all the three

months on the surrounding mountains. The snow accumulation at the end of the period was below normal.

(*d*) *Kargil.* Snowfall occurred on 11 days in March and on 6 days in April upto the level of Kargil on each occasion. In May there was no snowfall. Accumulations at the end of the period on well-known passes and peaks were about 4 ft.

(*e*) *Sonamarg.*—Accumulations at the end of May were greater than usual.

(*f*) *Leh.*—There was more snow than usual on peaks and passes, and the northern pass was open only for pedestrians.

VI.—Punjab.

(*a*) *Murree.*—There was one snowstorm on the 25th March and snow fell to a depth of 7″. All the snow melted away by the end of April.

(*b*) *Chamba.*—Upto the middle of May there were occasional heavy falls of snow on elevations above 7,000 ft. Accumulations of snow at the end of the period were about 15 ft. on the well-known passes and peaks and were far above the average.

(*c*) *Kulu* (*Kangra District*).—Several falls occurred at elevations about 8,000 ft. in March and above 10,000 ft. in April.

Accumulations at the end of May on well-known passes and peaks are given in the following table :—

Locality.	Depth of Accumulations.
	Ft.
Rohtang Pass	6
Hampta Pass	6
Pujadhar	4
Chandarkhani	5

(*d*) *Kilba* (*Simla District*).—Snow fell on three days in March, and on five days in April generally down to elevations of 8,000 ft. In May snow fell on nine days and was confined to elevations about 10,000 ft. Accumulations at the end of each month were reported to be much above normal.

VII.—United Provinces.

(*a*) *Almorah.*—The following tables give the approximate amounts of falls and accumulations at the end of each month as reported by the Patwaris :—

Actuals.

Locality.	March.	April.	May.
	Ft. in.	Ft. in.	Ft. in
Biyans . . .	6 9	20 0	31 0
Malla Darma . .	8 4	6 0	7 0
Malla Johar . .	4 0	7 0	..
Malla Danpur . .	0 6	2 0	0 6

Accumulations.

Locality.	March.	April.	May.
	Ft.	Ft.	Ft.
Nuwe . . .	15	5¾	15
Lepu	4½	20	24
Lampia . . .	6¾	30	36
Pindari . . .	15	..	4
Kafini . . .	5	8	4
Kantila . . .	5	8	5
Nandakote . .	15	..	..
Phurkia . . .	5	8	..

The snowfall for the season was reported to be above normal.

(*b*) *Garhwal.*—Snowfall during the period and its accumulations at the end of May were reported to be far above normal.

VIII.—Assam.

(*a*) *Kamrup.*—No snowfall occurred.

(*b*) *Sadiya Frontier Tract.*—Falls and accumulations were normal.

(*c*) *Baliapara Frontier Tract.*—The accumulations at the end of April were 2 to 3 ft. on the Piri La, Jhum La and Penkim La and very deep on the Se La.

South-West monsoon period, June to September.

June and July.

I.—Persia.

No reports were received.

II.—Afghanistan.

Kabul.—There were no falls during this period. The snow-levels were normal.

III.—North-West Frontier Province.

(*a*) *Hazara.*—Elevations from 10,000 to 17,500 ft. had falls ranging from ¼′ to ¾′ in both the months.

(*b*) *Dir, Swat, and Chitral.*—No snowfall was reported in this locality during the period. There was an abnormal accumulation of snow in the higher regions round about Chitral till the middle of June. The accumulations near Malakand were less than normal.

(*c*) *Khyber Agency.*—Near about Tirah no snowfall was reported during the period. As usual, snow existed on the tops of Gurdama, Malaka and Adina.

(*d*) *Kurram.*—No falls were reported. The accumulations on the peaks of the Safed Koh at the end of July were above normal.

(*e*) *South Waziristan.*—There were no accumulations of snow on any of the mountain ranges or passes in south Waziristan at the end of the period.

IV.—Kashmir.

(*a*) *Skardu.*—Fresh snowfall was observed on the adjacent hills on the 11th June, but none in July.

(*b*) *Dras.*—Falls occurred on six days in each of the months June and July. The depth of accumulations at the end of June and July measured 3 ft. and 2½ ft. respectively. Snowfall was below normal in June and normal in July.

(*c*) *Srinagar.*—On three days in June, *i.e.*, 1st, 10th and 22nd June, light to moderate falls were observed on the Pir Panjal and Harwan mountain ranges.

(*d*) *Gulmarg.*—Three fresh light to moderate falls were observed on the Afarwat range in June and one light fall in July. The falls were reported to be normal in June and below normal in July. Accumulations measured about 2 ft. at the end of June and about 6 inches at the end of July.

(*e*) *Kargil.*—There was no snowfall either in June or July. Snow disappeared from the passes by the end of July.

(*f*) *Gurez.*—The Razdaini Burzula were covered with snow at the end of July varying from 2 to 4½ ft. in depth. The accumulations were above normal.

(*g*) *Leh.*—There were slight snowfalls on peaks down to 17,000 ft. during the period. There was very little snow on the northern passes at the end of July.

V.—Punjab.

(*a*) *Chamba.*—There was no snowfall anywhere in the Chamba State during the period. Accumulations existed above elevations of 11,000 ft. and were above average.

(*b*) *Kulu.*—No snow fell during the period except for some light falls above 16,000 ft. in July. Snow accumulations at the end of the period were reported to be less than normal.

(*c*) *Kilba* (*Simla District*).—No definite information is available regarding snowfall on higher peaks. Owing to a cold spring the melting of snow was delayed and the passes and peaks which are usually clear by the 15th June were covered with snow even at the end of July. The estimated approximate accumulations on the well-known passes and peaks at the end of June and July are in the following table:—

Locality.	Depth of accumulations at the end of	
	June.	July.
	Ft.	Ft.
Kailash Peak	20	17
Rupin Ghat	9	7
Bruin Ghat	13	11
Cherang Pass	9	7 inches
Shatul Pass	10	8 „

VI.—United Provinces.

(*a*) *Almorah.*—The following tables give the amounts of falls and accumulations at the end of each month:—

Actuals.

Locality.	June.	July.
	Ft.	Ft.
Malla Danpur	½	..
Malla Darma	6½	3½
Biyans	7⅔	9
Chaudans	..	1

Accumulations.

Locality.	June.	July.
	Ft.	Ft.
Kafini	4	..
Ketols	5	..
Nuwe	10	5
Lepu	15	6
Lampia	22	9
Bikarun	..	4

(*b*) *Garhwal.*—There was about one foot of snow on hills of ordinary height and about 3 ft. on high peaks in both the months. Falls and accumulations were above normal.

August and September.

I.—Persia.

No reports were received.

II.—Afghanistan.

No reports were received.

III.—Baluchistan.

No falls occurred.

IV.—North-West Frontier Province.

A few falls occurred in the Hindu Raj Range at an elevation of about 19,000 ft. during the last week of August. In September snow-fall occurred in the neighbourhood of Chitral at heights above 10,000 ft.

V.—Kashmir.

(*a*) *Skardu.*—Seven falls were reported in August and five in September at elevations generally above 14,000 ft. The falls were above the average.

(*b*) *Dras.*—In August there were eleven days of snowfall on the Zojila and Mushko Passes. In September there were six days of fall. The falls were above normal. The accumulations on the Zojila and Mushko Passes were about six inches deep at the end of August and 1½ ft. at the end of the period, and were above normal.

(*c*) *Srinagar.*—No falls occurred and there were no accumulations at the end of the period.

(*d*) *Gulmarg.*—On the Afarwat range several fresh light falls were observed during August. The accumulations on the higher peaks were estimated to be 3 inches at the end of August.

(*e*) *Kargil.*—No snowfall occurred in August. In September the adjoining Nacthala peak experienced falls on four days. There were no accumulations at the end of the period.

VI.—Punjab.

Kilba.—No falls occurred in August. There were six days of snow at high elevations in September. The accumulations at the end of each month are shown in the following table :—

Locality.	Accumulations at the end of	
	August.	September.
	Ft.	Ft.
Kailash Peak	15	13
Rupan Pass	8	4
Brua Pass	6	6
Shatul Pass	7	½

VII.—United Provinces.

Almorah.—The actual amounts of snow are given in the following table :—

Locality.	August.	September.
	Ft.	
Malla Danpur	½	..
Malla Johar	2¾	..
Malla Darma	4½	4½
Biyans	2½	2½

The falls were below normal in Biyans and Malla Danpur and above it in Malla Johar and Malla Darma. The depths of accumulations are in the following table :—

Locality.	Accumulations at the end of	
	August.	September.
	Ft.	Ft.
Nuwe Pass	3	5
Lampia Pass	6	13½
Lepu Pass	4	9
Milan Pass	1	..

The retreating monsoon period, October to December.

I.—Persia.

No reports were received.

II.—Afghanistan.

Kabul.—On October 12th there was a slight snowfall on the Paghman hills. The first heavy precipitation on the Paghman range and on the Hindu Kush was on November 19th, and there were further falls till the 3rd December. The snowfall for this period was reported to be normal.

III.—Baluchistan.

Quetta.—There were light falls on the surrounding hills on the 3rd and 20th December. The snowfall for the period was about normal.

IV.—North-West Frontier Province.

(*a*) *Hazara.*—Snow fell on seven days in December. The accumulations at the end of the period were below normal.

(*b*) *Dir, Swat, and Chitral.*—A few falls of snow occurred in October while there were five days of snow in November and three days in December. The falls were reported to be above the average.

(*c*) *Khyber Agency.*—Snow fell on the peaks of the Safed Koh on three days in November and on one day in December. The accumulations at the end of December were above normal.

(*d*) *Kohat.*—There was no snowfall during the period.

(*e*) *South Waziristan.*—There were two light falls of snow on the ranges of 7,000 ft. and over, in the first week of December.

V.—Kashmir.

(*a*) *Skardu.*—Snowfall was observed on surrounding mountains generally above 9,000 ft. on four days in October, five days in November and two days in December. The last fall on 23rd December came down to station level. The falls were above normal in October and November and below it in December. The accumulations at the end of the period on the surrounding mountains were about 1½ ft. deep.

(*b*) *Dras.*—There were five days of snowfall in October, seven in November and three in December. The amounts were above normal in October and November, and below it in December. There was about one foot of snow at Dras at the end of the period. On the Zojila and Mushko Passes snow accumulations amounted to 3½ ft. at the end of October, 5 ft. at the end of November and 4 ft. at the end of December.

(*c*) *Srinagar.*—Two falls were reported in October and several in November and December. The falls were normal during October and November but were in defect during December.

(*d*) *Kargil.*—During October six falls of snow were observed on the adjoining mountains. Three falls occurred in November and two in December, the snow-line descending to Kargil ground level each time. The depths of accumulations at the end of the period were about 8 inches on the higher peaks and passes. The falls and accumulations were below normal.

(*e*) *Sonamarg.*—Light falls were reported in October.

(*f*) *Leh.*—Occasional light falls were reported but the lower passes were all open at the end of December.

VI.—Punjab.

(*a*) *Kulu* (*Kangra District*).—There were two slight falls in Kulu and Saraj, one in November and the other in December. The falls amounted to about a foot on the majority of passes.

(*b*) *Kilba* (*Simla District*).—There were two falls of snow in October on elevations above 7,500 ft. Snow fell at Purbani and Sanglah on the 27th November while in December there was no snowfall below 15,000 ft. The following table gives the depths of accumulations on well-known passes and peaks at the end of each month :—

Locality.	Depths of accumulations at the end of		
	October.	November.	December.
	Ft.	Ft.	Ft.
Kailash Peak . . .	14	16	17
Rupan Pass	5	7	8
Brua Pass	7	8	10
Shatul Pass . . .	6	8	10

VII.—United Provinces.

(*a*) *Almorah.*—The total falls for each of the months are indicated in the following table :—

Locality.	October.	November.	December.
	Ft.	Ft.	Ft.
Malla Darma . .	9	1½	4
Malla Danpur . .	1¼	1	1
Bivans . . .	18	..	3
Malla Johar . .	..	..	3

Snowfall throughout the period was above normal. The following table gives the accumulations at the end of each month during the period :—

Locality.	October.	November.	December.
	Ft.	Ft.	Ft.
Nuwe . . .	13	11	13
Lampia . . .	15	..	21
Lepu	10	..	14
Nandakote . .	15	..	..
Trisul . . .	15	..	..
Kafini . . .	..	2	5
Kantila . . .	..	2½	5
Milan . . .	..	..	2½

(*b*) *Garhwal.*—There were three days of snowfall amounting to one foot in October. In December snow fell on two days to a total depth of about two feet.

VIII.—Assam.

(*a*) *Kamrup.*—The falls and accumulations were nearly normal.

(*b*) *Sadiya Frontier Tract.*—The falls were normal except on the North East watershed of the Dibang where there was very heavy snowfall.

(*c*) *Baliapara Frontier Tract.*—There has been little or no snowfall on the Se La range. The accumulations at the end of the period were about 2 to 3 ft.

Summary.

Cold weather period, January and February.—Falls and accumulations were above normal except in Kashmir and Baluchistan where they were about normal.

Hot weather period, March to May.—Baluchistan experienced no falls and Assam normal falls. Elsewhere snowfall was above normal.

Snow accumulations at the end of the period were above normal in the Kumaon Hills and throughout the western Himalayas and normal in Assam.

The south-west monsoon period, June and July.—Both the falls and the accumulations were normal in Kashmir and the North-West Frontier Province. In the Punjab and the United Provinces snowfall was normal while the accumulations were above normal.

The south-west monsoon period, August and September.—Falls and accumulations were below normal in the United Provinces and the Punjab, and normal in Kashmir.

The retreating monsoon period, October to December.—Snowfall was in large defect in Kashmir during December. The accumulations at the end of the period were normal in the North-West Frontier Province and the Punjab and in excess in the United Provinces.

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