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embraces the Panjab and Sind will afford the verification desired by completing the circuit from the mean sea level at Kurrachee, round the Punjab and back to the same point.
Though the internal checks on the heights of any G. T. Survey series are in themselves complete, still slight errors may creep in which can only be detected on the completion of the levelling from sea to sea. Hence a small correction may hereafter be applied to the heights of the Kashmir series, though as I before said, it is not likely to affect materially the values that I now send you.

Hitherto the Nanga Parbst, which is also culled Dayarmur, has been put down as 19,000 feet above the sea, being nearly a mile and a half below its actual elevation. Rather a bad shot for conjectural geography.

Though by no means equal to mount Everest,* atill the Nanga Parbat is as much the king of the northern Himalayas as mount Everest is tie king of the southern Himalayas.
My series has already added to the G. T. Survey all the peaks to the south of the Indus, and now the G. T. Survey may be said to have fixed all the peaks in the Himalayas with the exception of a few about the sources of the river Indus.
During my three days' residence on the snowy mountain Haramook, at upwards of 16,000 feet above the sea, I had several fine views of the Karakooram range and of the ranges to the north of the Indus. Amongst others two very fine peaks were visible beyond the general outline of the Mustagh and Karakooram ranges, These two peaks promise to be high. They were well but faintly defined against the sky being probably about 150 miles from me. I hope to have the pleasure of sending you their heights at the beginning of next year.
The memorandum iucludes several well known mountains such as "Ser" and "Mer," Haramook, Baltal, \&c. The heights now given do not agree with those that have hitherto been taken for granted by former explorers.
I trust the accompanying heights and positions may prove a useful and interesting contribution to accurate geograghy.

Dhera Dhoon, 27th January, 1857.

[^0]The geographical co-ordinates of the Himalayan peaks enamerated in the accompanying list have been derived from the geodetical operations of the Kashmir meridional series of the G. T. Survey of India.

This series commenced by order of Colonel Waugh in 1855, emanates from a side of the north-west longitudinal series in the low ranges north of Sealkote.

The triangulation of the series has been carried across the snowy ridge of Chattardhar, over the Pir Panjal and the great range to the north of Kashmir, by means of symmetrical quadrilaterals and polygons.

Luminous signals* have been used throughout, and the rigorous system of the G. T. Survey of India has nowhere been abated, notwithstanding the physical difficulties presented by the snows ranges, and the severe climate on their summits, so trying to the natives of India employed as lampmen and heliotropers.

The Nanga Parbat or Dayarmur is a snowy mountain to the north of Kashmir, midway between that valley and the river Indus. The splendid mass of snow presented by this peak and its subordinate pinnacles can be seen to the best advantage from the western side of Kashmir, when it is viewed across the great Walpar lake. The upper portion of the mountain for 5,000 feet is precipitons, and the neighbouring ranges never attain an altitude of more than 17,000 feet, consequently this magnificent peak, rising to an eleration of $\mathbf{2 6 , 6 2 9}$ feet above the sea, naturally forms a noble object in whatever aspect it is viewed.

Among the remaining mountains there are many fine peaks, the most remarkable being "Ser" and "Mer," twin giants, the former white and the latter dark, because it is too precipitous to retain much snow on the Kashmir side. Ser and Mer are also called Nana Khana, as well as Dum Huy and Pajah Huy, besides other appellations. These peaks and all from No. 1 to No. 12 are well known to those sportsmen who shoot ibex in the Wardwan valley.

[^1]Baltal, Haramook, the highest points of the Pir Panjal and Nos. 16 to 27 inclusive are visible from various parts of Kashmir.
The position and heights of these mountains have been determined by observations taken at the principal stations of the Kashmir series. For instance the Nanga Parbat has been determined by obeervations with a 14 inch theodolite from eleven principal stations at distances varying from 43 to 183 miles and at heights ranging from 7,700 to 16,000 and odd feet.
Four or more independent computations have been made for each point, the accompanying abstract of the results of the computations of the Nanga Parbat may be taken as a fair specimen. In this instance, the latitude and longitude have been derived from seven independent deductions, the heights from eleven, and the distances from the same number of triangles. The extreme difference from the mean is only one-tenth of a second in latitude and longitude, and only 25 feet in height, being as accordant as could be expected, considering that it is an unmarked peak, that the attruction of the mountains is very great, and that no doubt, between observations, variations did oecur caused by falls of snow at one time, and by the melting of the same at another.
The refraction used for completing the height of the Nanga Parbat as well as of the other peaks has throughout been determined practically from my own reciprocal observations between principal stations, that is to say from observations to and from those elevated points of the Himalayan range, which were actually occupied for the purpose of observation while extending the series of great triangles across the Pir Panjal and the great snowy barrier to the north of the valley.
The akeleton chart shows the geographical position of the Nanga Parbat and the other peaks in the accompanying list. The position of Murree, Jhelum, Sealkote, Srinagar, and other places being added for the sake of illustration.

[^2]Abstract of the position of the Nanga Parbat.


Series:


Kashmir Series.


## Monorandum of Heights and Positions of the Nanga Parbat and other Mountains.

| James of Mountaiza, | Mean <br> Height. | Mean Latitude. | Mean <br> Longitude. | Remarks. |
| :---: | :---: | :---: | :---: | :---: |
|  | feet. | - ' " | o " |  |
| Nanga Parbat Snowy Peat,$\ldots . . . . . . . . . . . . . . . . . ~$ | 26,629.1 | 351421.5 | 743752.5 | Or Dayamur. |
| Ser ditto;.............. | 23,406.9 | 335856.17 | 76 | \} Or Nana, Khana, do. |
| Mer ditto, ...er...... | 23,264.4 | $344087.7{ }^{3}$ | $\begin{array}{lllll}76 & 5 & 51.4\end{array}$ |  |
| Baltal ditto, ......... | 17,839.4 | 34.955 .47 | 752210.3 |  |
| Hramook ditto,...... | 16,902.9 | 342456 | 745783 |  |
| Kashmir Series, Snowy Peak, No. 1, ....... | 16,662.0 | 381118.8 | 76535.8 |  |
| Ditto, \% 2, ...... | 19,906.0 | 331918.17 | 762022.7 |  |
| Ditto, \% 8, ...... | 21,288.6 | 338718.9 | 761150.9 | A Snowy Cone. |
| Ditto, \% 4, ...... | 20,054.2 | 332722.57 | 76 |  |
| Ditto, " 5, ...... | 21,059.3 | 333015.47 | 76 | A fine Snowy Cone. |
| Ditto, \% 6, ...... | 21,584.8 | 333626.6 | 761025.8 |  |
| Ditto, \% 7, ...... | 18,739.3 | 333453.1 | 761339.0 |  |
| Ditto, \% 8, ...... | 20,988.0 | 33441.6 | 76 |  |
| Ditto, \#10, ...... | 19,841.3 | 34022.4 | 755258.3 |  |
| Ditto, ", 11, .. ${ }^{\text {a }}$ | 19,597.0 | 34.614 .9 | 754542.1 |  |
| Ditto, (PCormandal ke $\text { Sir,) No. 12, } . . .$ | 17,051.9 | $\begin{array}{lll}34 & 3 & 37.8\end{array}$ | 753349.1 | [Kashmir \& Wardwan. East of a pass between |
| Kashmir Seriea, Snowy Peak, No. 16, .. .... | 17,014.5 | 34.567 .4 | 74.2143 .1 |  |
| Ditto, „ 17, ...... |  | 3455330.6 | 7441859.9 |  |
| Ditto, \% 19, ...... | 20,740.3 | $35 \quad 765.7$ | 742842.2 |  |
| Ditto, \#21, ...... | 14,874.5 | 3448481.7 | 7445654 | Above Khágán. |
| Ditto, "22, ...... | 1487. | 344649.4 | 735551.1 | Ditto. |
| Ditto, (Peer ke dheri), No. 23, | 16,486.6 | 344380.9 | 73460.2 | Ditto. |
| Ditto, (Bijti-ke-Sir), <br> No. 24, …....... |  | 343818.6 | 738344.4 | Ditto. |
| Ditto, (Neelea) No. 25, | 15,584.5 | 343555.1 | 734143.4 | Ditto. |
| Kashmir Series, Snowy Peak, No. 26, ....... | 16,227.8 | 35045.7 | 741322.4 |  |
| Ditto, n 27, ....... |  | 345626.8 | 74.34 .6 .6 |  |
| Ditto, (d), ...... | 18,052.4 | 342215.4 | 752929.7 |  |
| Ditto, (e), ...... | 17,320.7 | 341334.4 | 75324.5 | Above the Ambernith caves. <br> [Glacier. |
| Ditto, (f), ...... | 17,903.7 | 341348.9 | 759740.8 | Above the Matchahoy |
| Ditto, (i), ...... | 17,642.7 | 34.3050 .3 | 3753830.4 | In the Hembaps Ranga. |
| Ditto, (j), ...... | 17,369.3 | 343184.4 | 754427.6 | Ditto, ditto. |
| Ditto, (x), ...... | 19,376.7 | 341723.6 | 754959.2 | About 8 miles 8. W. of Dras fort. |

Momorandum of Heights, \&c., (continued).


Farther Observations taken at Kanúrí Nár H. S. by Lieut. Brownlow, Fagre to the two peaks observed at Haramook H. S. by Lieut. Montgomerie, Engra, in September, 1856, give the following results.

> Height in feet. Distanco in milea.



[^0]:    - Déo-dhúnga.-Fid.

[^1]:    - Heliotropes and lamps.
    + For a beautiful and characteristic aketch of this mountain, vide page th, of Major (now Lt. Colonel) Cunningham's work on Ladak.

[^2]:    *Troughton and Simms, No. 5, G. T. S.
    $\dagger$ The term unmarked in the G. T. S. means a peak in which no signal mark has been ereoted.

