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JAMMU & KASHMIR RAILWAY

Proposed Western routes

REPORT

BY

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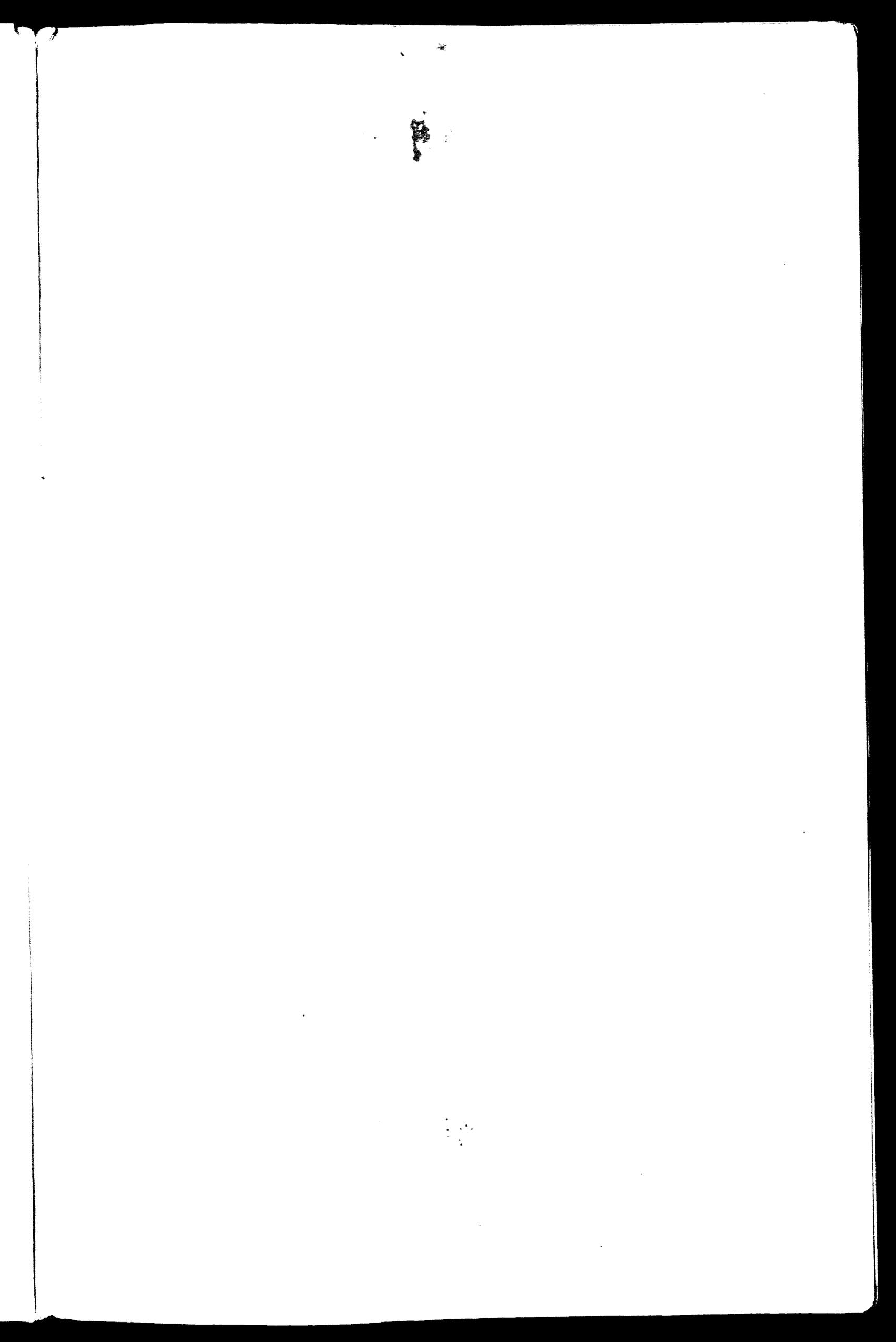
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JAMMU & KASHMIR RAILWAY, WESTERN ROUTES.

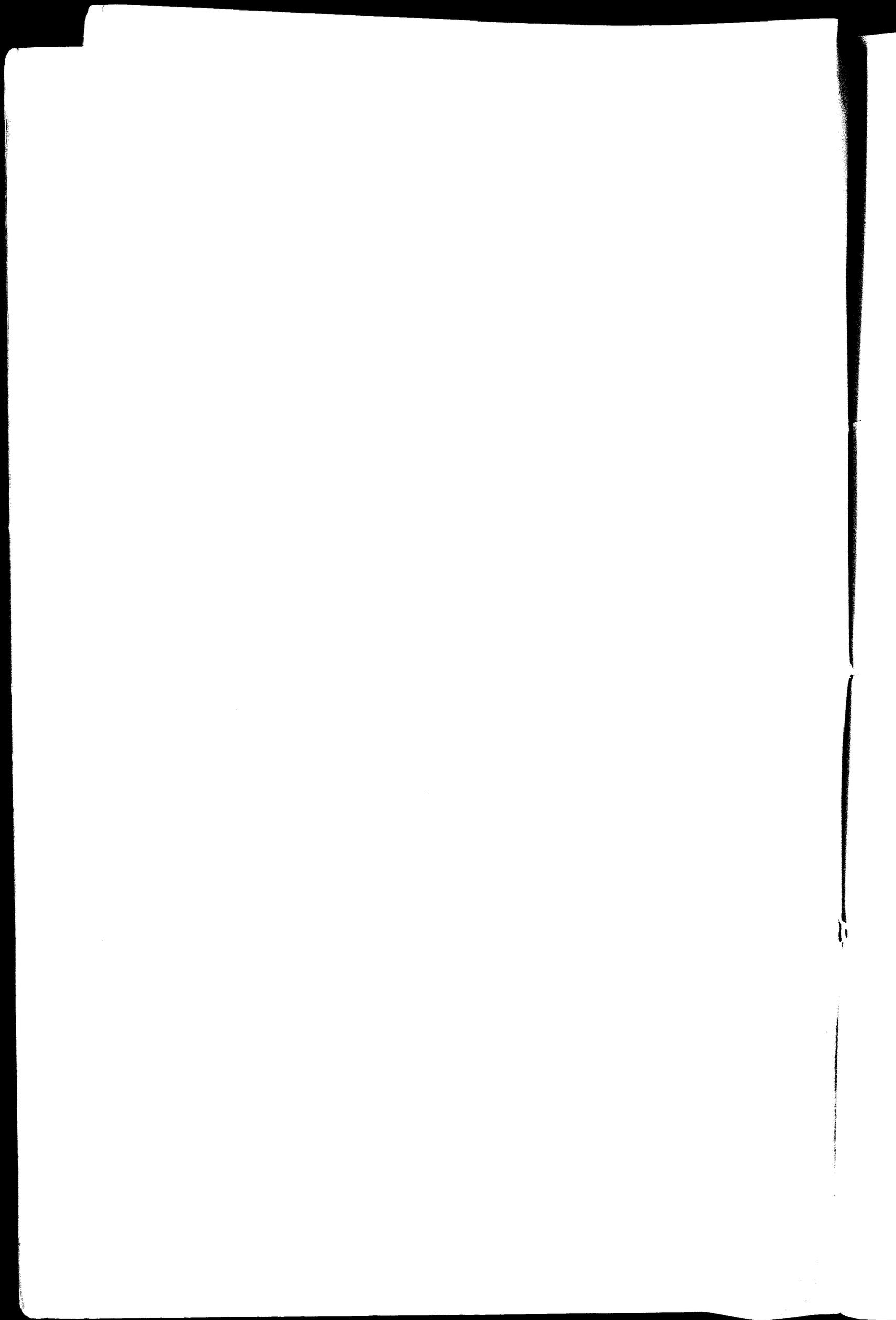
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JAMMU AND KASHMIR RAILWAY.

CHAPTER I.

Preliminary.

A copy of Mr. W. J. Weightman's supplementary report on the Abbottabad route was received by me on the 8th November, from Rai Sahib Lala Narayan Dass, the Public Works Member of the Jammu and Kashmir State Council.

2. My remarks on this report will follow the same headings so as to avoid repetition of details. I agree largely in the statements made by Mr. W. J. Weightman, and where I differ from his conclusions, the reasons for the same are given in full.

3. The two Western routes proposed for a railway between the Punjab and Kashmir *viz.*

I. Mandra Station on N. W. railway by Kohala and Domel, and up the left bank of the Jhelum valley to Baramulla and Srinagar.

II. Serai Kala Station on N. W. railway by Abbottabad and Domel and up the right bank of the Jhelum valley to Baramulla and Srinagar, have always been recognized as the easiest routes for construction, owing to the less rise and fall, to the flatter gradients, to the absence of long tunnels, to the less snow encountered in winter and to the less cost to the State.

No. I route, after being surveyed in detail, was discarded owing chiefly to the treacherous nature of the rock formation in the hill sides of the lower Jhelum valley and of these two, No. II route was considered the most practicable, though from Domel upwards to Uri, along both right and left banks of the Jhelum river about 50 miles, the same Murree rock formation exists. The expense and trouble of maintaining a railway in this length will be heavy, judging from the experience of the Jhelum cart road on the left bank during the last 10 years.

Mr. J. A. Anderson who surveyed both lines in detail gave the preference to the location on the right bank, as the best ground on the left bank was already occupied by the cart road and he was under orders not to interfere with the latter.

4. Stated broadly, the Jammu and Kashmir State has hitherto favoured the adoption of one of the eastern routes as giving direct access between its two Capitals, Jammu and Srinagar, as the shortest route for the trade to Lahore and Amritsar, as being situated throughout in its own territory, as serving the heart of its two Provinces, Jammu and Kashmir, while it has deprecated the selection of any western route owing to the longer detour for public traffic to and from Lahore and Amritsar, to the higher charge thus entailed on the public, and to this line serving only a corner of the Kashmir province and avoiding Jammu altogether.

5. The Durbar at the same time was, however, naturally influenced by the financial consideration that the cost to the State of the Abbottabad route would only be one half that of the Banihal route, as about one half of the length is situated in British territory, and would be paid for by the Government of India.

It also recognised that from an Imperial point of view, the route by Abbottabad might possibly best serve the needs of Empire for defence of the Frontier and it was, therefore, willing to leave the selection of the best route, on the whole, to the Government of India and to abide by its decision.

6. It appears from recent information that the Government of India may now be disposed to sanction the construction of a branch railway on the 5½ feet gauge, from Serai Kala to Abbottabad with Imperial funds, and the question arises whether the railway should be extended, either on the metre gauge or on the 2½ feet gauge, thence across the Kaghan Valley and up the Jhelum valley to Kashmir.

In all probability the Jammu and Kashmir State would have to provide, in the first instance, the funds for construction between Abbottabad and Srinagar on the promise of the Government of India to refund that portion, which may be spent on the line in British territory from Abbottabad to the border.

CHAPTER II.

Description of Route.

7. There is no need to report in detail the description of the Abbottabad route, as laid out by Mr. J. A. Anderson. This is accurately given by Mr. W. J. Weightman, who proposes the following modifications.

8. (a). To adopt a ruling gradient of 1 in 40 throughout instead of 1 in 70.

There is no objection to this change, though in the ascent to Abbottabad an easier gradient for the $5\frac{1}{2}$ feet gauge should, if practicable, be adopted.

9. (b). To ascend from the Dor river crossing to Abbottabad by the Sulhud ravine instead of by the Dor valley.

I do not favour this proposal, there is no traffic to be picked up in winding through the Sulhud ravine, while in the Dor valley large villages would be served, such as Haveliyan, Rajoica, Dhamtour, Nowshera, also possible coal working near the crossing of the Dor river by the Abbottabad and Murree Road.

The site for a station selected by Mr. J. A. Anderson on the open and broad plateau outside and north of Abbottabad, about midway between the old and proposed new Cantonment, seems an excellent one, and there is ample room for all the requirements of a break of gauge.

There would be an advantage in keeping this line clear of the metalled road, which also winds up the Sulhud ravine into Abbottabad.

10. (c) From Abbottabad onwards, a gauge of $2\frac{1}{2}$ feet with ruling gradient of 1 in 40 and curve of minimum radius 100 feet to be adopted. There is no objection to this change of gradient, if necessary, though in my opinion a minimum radius of 150 feet should be adopted for curves.

11. (d) The Tunnel at Lohar Gully to be raised from 2450 feet above mean sea level, and a length of 4520 feet to 2700 feet elevation and a length of 3000 feet.

I do not approve of this change, the upper strata are of very loose friable shale, and the lower the tunnel, the firmer will be the formation. In any case this tunnel will have to be lined throughout.

12. (e) To take the line from Domel to Baramulla up the left bank of the Jhelum river, utilizing and widening the cart road, so as to leave space for carts along side the railway.

The question of whether it is practicable to make and maintain a railway alongside of the cart road, up the left bank of the Jhelum river between Domel and Uri, is a very doubtful one.

The rock formation is of the Murree group composed of alternate bands of red clay and sandstone. The clay is full of Gypsum and when saturated with wet, it expands and dislocates the adjoining layers of sandstone, causing huge slips.

It has been difficult and costly enough to cut a width of 12 to 16 feet out of the hillside, and to maintain a free way for wheeled traffic during the rainy season, but to double this width by cutting further into the hillside is sure to entail the fall of enormous slips and rocks from the slopes above, and once these begin, there is no saying where they will end. Slips sometimes occur along the whole height of the mountain from the base to the ridge.

Even if both are made, a cart road, outside of the railway winding in and out around the hill spurs, will not be of much use.

Laden animals, rounding corners and coming into sudden sight of the running trains, are sure to shy and to cause accidents. The road will gradually be deserted, its maintenance will still have to be defrayed by the State, and it will only serve for footmen and when troops are marching to or from Kashmir.

13. Though I do not think it safe or advisable to widen the hill side cutting, as proposed, yet the rails could be laid on the existing cart road, and the latter be converted into a railway, provided that for Military purposes a metre gauge be adopted instead of a $2\frac{1}{2}$ feet gauge. A metre gauge would be capable of carrying all the traffic both commercial and military that would arise, while the $2\frac{1}{2}$ feet gauge is not of much use for the transport of large bodies of troops and of extensive Military stores. In either case, it would be necessary to retain a foot way along side the line for pedestrians.

The present cart road was originally undertaken as a military road, and if it must still be kept intact for this purpose, then a $2\frac{1}{2}$ feet gauge railway from Domel to Baramulla might be constructed along the right bank of the Jhelum river as first located by Mr. J. A. Anderson. The drawback to this plan is, that the cart road on the left bank would seldom be used except by villagers, and for Military transport, and the Jammu and Kashmir State would have to keep up two separate lines of communication.

It would, however, cost as much if not more to maintain the cart road and rail road if laid side by side, as the wider the hill cutting the more will the hill slopes above be unsettled, and the greater will be the fall of rocks and the avalanches of stone after heavy rain.

Another drawback would be that any local traffic, to and from Poonch for Srinagar, would have to cross the Jhelum river at Uri to gain access to the railway on the right bank.

14. The length of a metre gauge railway from Abbottabad to Srinagar, along the left bank of the Jhelum river was estimated by Mr. J. A. Anderson to be 146.69 miles, while that of a $2\frac{1}{2}$ feet gauge along either the left or right bank may be roughly estimated at 145 miles.

CHAPTER III.

Cost of line.

15. A comparison of the estimates of cost for construction of the Abbottabad route, as prepared by Mr. J. A. Anderson and Mr. W. J. Weightman, shows the extent of reduction proposed by the latter.

The contrast between his treatment of the estimates on the Banihal route, and of those on the Abbottabad route, is very marked. On the former, Mr. J. Adam's No. 4 estimate of Rs. 1,85,87,000 was increased to Rs. 2,56,16,800 on the latter. Mr. J. A. Anderson's estimate of Rs. 2,57,31,325 was decreased to Rs. 1,68,00,000.

On the length of 30 miles between Islamabad and Srinagar, Mr. W. J. Weightman approved of an estimate of Rs. 62,500 per mile of $2\frac{1}{2}$ feet gauge, while on the length of 30 miles between Srinagar and Baramulla, he has reduced an estimate of Rs. 54,507 per mile of metre gauge to Rs. 40,000 per mile of $2\frac{1}{2}$ feet gauge.

I do not concur in many of his reductions, and think that Mr. J. A. Anderson's figures are still reliable, though estimated 10 years ago. It will be noticed that the mileage price of permanent way is much the same now as formerly.

Mr. J. A. Anderson. Mr. W. J. Weightman.

	broad gauge.		broad gauge.	
	Rs.	Miles.	Rs.	Miles.
Sarai Kala to Abbottabad...	71,75,352	54.67	51,00,000	48
Length in miles...	.....	.....	.....	.....
Rate per mile ...	1,31,248	.....	1,06,250	.....
Abbottabad to Domel	83,58,953	47.88	42,00,000	40
Length in miles	.....	.....	.....	.....
Rate per mile ...	1,74,580	.....	95,238	.....
Domel to Baramulla	85,29,067	68.21	63,00,000	75
Length in miles	.....	.....	.....	.....
Rate per mile ...	1,25,041	.....	84,000	.....
Baramulla to Srinagar	16,67,950	30.60	12,00,000	30
Length in miles	.....	.....	.....	.....
Rate per mile ...	54,507	.....	40,000	.....
Grand Total	2,57,31,325	201.36	1,68,00,000	193

	broad gauge		broad gauge	
	Rs.	75 lbs.	Rs.	75 lbs.
Permanent way				
Weight of rails to yard	26,300	.....	29,000	.....
Cost per mile ...	.....	.....	.....	.....
Weight of rails to yard	18,550	50 lbs.	18,000	40½ "
Cost per mile ...	.....	.....	.....	.....
Ruling gradients	.....	1 in 70	.....	1 in 40
Do.	.....	{ 1 in 60	Abbottabad to Juba	
Do.	.....	{ 1 in 40	Juba to Srinagar	
Radius of curves	813 feet	.....	100 feet	.....
Do.	500 feet	.....	20 feet	.....
Formation width	20 feet	.....	20 feet	.....
Do.	16 feet	.....	12 feet	.....

17. I would retain the estimate of Rs. 71,75,352 for the 5½ feet gauge line from Serai Kala to Abbottabad 54.67 miles, and follow the general alignment of Mr. J. A. Anderson up the Dor valley, with such a ruling gradient in excess of 1 in 40, as will admit of keeping to the floor of the valley as near as may be practicable.

On the length Abbottabad to Domel 47.88 miles metre gauge. I would retain the estimate of Rs. 83,58,956 on a ruling gradient of 1 in 60.

On the length Domel to Baramulla left bank of Jhelum river 68.21 miles metre gauge with the rails laid on the cart road, Mr. J. A. Anderson's estimate of Rs. 98,12,445 may be reduced to Rs. 68,21,000, on a ruling gradient of 1 in 40, as the former figure was for a line situated generally beneath the cart road and quite separate from it.

On the length Baramulla to Srinagar 30.60 miles metre gauge, I would retain Mr. J. A. Anderson's estimate of Rs. 16,67,650 on a ruling gradient of 1 in 40.

Total length 201.36 miles at an estimated cost of Rs. 2,40,23,258.

Of this 90 miles are situated in British territory to cost Rs. 1,33,43,330, and 111.36 miles are situated in the Kashmir territory to cost Rs. 1,06,79,929.

18. Should it be decided to leave the cart road intact for Military transport, and to locate the railway on the right bank of the Jhelum river, the latter may be made either of the metre or 2½ feet gauges.

If the former, I would retain Mr. J. A. Anderson's estimate of Rs. 85,29,067 for the 68·21 miles from Domel to Baramulla, and the Grand total cost would then become Rs. 2,57,31,325 of which 90 miles in British territory to cost Rs. 1,33,43,330 and 111·36 miles in Kashmir territory to cost Rs. 1,23,87,996.

19. If the $2\frac{1}{2}$ feet gauge be adopted, and the line be taken up the right bank of the Jhelum river from Domel to Baramulla, the estimates may stand approximately as under:—

Rs. 71,75,352, broad gauge 54·67 miles Serai Kala to Abbottabad.
 Rs. 1,43,41,250, $2\frac{1}{2}$ feet gauge 114·73 miles Abbottabad to Baramulla.
 Rs. 15,30,000, $2\frac{1}{2}$ feet gauge 30·60 miles Baramulla to Srinagar.
 Rs. 2,30,46,602, Grand total 200 miles from Serai Kala to Srinagar, of which 87 miles in British territory to cost Rs. 1,11,75,352 and 113 miles in Kashmir territory, to cost Rs. 1,18,71,250.

20. Of these 3 estimates of cost *via*:—

Rs. 249,23,258 for a metre gauge line on the left bank absorbing the cart road.

Rs. 2,57,31,325 for a metre gauge line on the right bank of the Jhelum river.

Rs. 2,30,46,602 for a $2\frac{1}{2}$ feet gauge line on the right bank.

The choice will depend partly upon the decision of Government as regards retaining the road upon the left bank for Military transport, and partly upon whether a $2\frac{1}{2}$ feet gauge will suffice eventually to carry all the public traffic between the Punjab and Kashmir.

This point has not yet been considered thoroughly, a $2\frac{1}{2}$ feet gauge may perhaps carry the existing traffic, but it will not suffice to carry the future traffic on such steep gradients and sharp curves.

Once made, the hill cutting cannot be safely widened and the result will be, that in course of time the Jammu and Kashmir State may either have to convert the $2\frac{1}{2}$ feet gauge into a metre gauge or to provide a second line of $2\frac{1}{2}$ feet gauge by another route.

CHAPTER IV.

Traffic Prospects.

21. *Through Traffic*.—The main objection to the circuitous route *via* Abbottabad is the longer distance which would entail an extra annual charge to the public on the through traffic both up and down, to and from Srinagar to Lahore and Amritsar.

The respective distances between Srinagar and Wazirabad being by Banihal 225 miles and by Abbottabad 330 miles, while between Srinagar and Jammu the direct distance would be 173 miles, and that round by Abbottabad 382 miles.

Assuming the figures of through traffic by the Banihal, as given by Mr. W. J. Weightman, the extra annual charge by Abbottabad would come to Rs. 2,19,000, see Appendix A, though this difference could be made to disappear, if an additional charge to the public be ever levied on account of tunnels. It is quite true that the public at present pays an even higher rate in travelling and carrying goods by the Jhelum cart road round by Murree and Rawalpindi, but the fact remains that omitting tunnel-fares and rates the direct route, *via* Banihal would save mileage fares and rates, especially on the traffic between

Srinagar and Jammu, which may become very large, the third class fare direct Rs. 4 if increased to Rs. 6-4-9 round by Abbottabad, would check the number of passengers considerably between the two capitals.

22. *Number of Passengers.*—I think with Mr. W. J. Weightman, that the same number of through passengers in the first class 2,500 and in the second class 3,500 are likely to travel by either route, but, as the third class passengers from Srinagar, bound for Jammu, will have to pay Rs. 6-4-9 by Abbottabad, instead of Rs. 4 by Banihal, there will be a large decrease in numbers to that place and I am willing to reduce my estimate of Rs. 100,000 by Banihal to 73,000 third class through passengers by Abbottabad, the figure adopted by Mr. W. J. Weightman.

23. *Maundage of through Goods.*—For the same reason there will be a decrease in the quantity of through goods booked between Srinagar and Jammu, owing to the higher rates charged round by Abbottabad, viz., Rs. 1-9-3½ per maund, instead of Rs. 1-5-7, via Banihal, and I am willing to reduce my estimate of 19 lacs maunds by Banihal to 12 lacs of maunds by Abbottabad, the figure fixed by Mr. W. J. Weightman.

24. I accept the fares and rates proposed by him, viz., on the section between Srinagar and Juba 122 miles.

First class passengers,	3 annas per mile.
Second „ „	1½ „ „ „
Third „ „	¾ „ „ „
Goods average	1½ pie per maund per mile.

And on the section between Juba to Serai Kala 78 miles.

First class passengers,	2 annas per mile.
Second „ „	1 „ „ „
Third „ „	¾ „ „ „
Goods average	1 pie per maund per mile,

25. *Local Traffic.*—I accept also his figure of local traffic in passengers and goods, except that from Poonch, passengers and goods going from Poonch to Uri may find their way by rail to Srinagar, but none will go down country. Those going from Poonch to Muzafferabad will travel by road, via, Kohala, while those for Rawalpindi will travel direct across the hills and over the Lachman Ferry of the Jhelum river.

The estimated *traffic receipts* will then be :—

Through traffic Serai Kala to Srinagar 200 miles.

	Rs.
Passengers 2,500 first class at Rs. 32-10-0	81,562
„ 3,500 second „ „ 16-5-0	57,093
„ 73,000 third „ „ 4-1-3	2,97,703
Goods 12,00,000 maunds at „ 1-5-9	16,31,250
Total	20,67,608

Local Traffic.

<i>Serai Kala to Abbottabad 55 miles.</i>	
Passengers 7,300 first class at Rs. 6 14 0	50,187
„ 14,600 second „ „ 3 7 0	50,187
„ 87,600 third „ „ 0 13 9	75,281
Goods 6,00,000 maunds „ „ 0 4 7	1,71,875
Total	3,47,530
<i>Abbottabad to Juba 23 miles.</i>	
Passengers 29,200 third class at Rs. 0 5 9	10,517
Goods 50,000 maunds „ „ 0 1 11	5,990
Total	16,507

Abbottabad to Muzafferabad 41 miles.				
Passengers 9,125 third class at	Rs.	0 12 6	...	7,129
Goods 25,000 maunds		0 1 11	...	6,510
			Total	13,639

Uri to Srinagar 60 miles,				
Passengers 5,475 third class at	Rs.	1 9 0	...	8,554
Goods 30,000 maunds at		0 7 6	...	14,062
			Total	22,616

Total local ... 4,00,292

Grand total gross earnings ... 24,67,910
 Which is equivalent to Rs. 237 per mile per week,
 Dividing this according to sections.

British section (87 miles).

55 miles Serai Kala to Abbottabad	...	...	7,83,232
23 ,, Abbottabad to Juba	...	...	1,98,709
9 ,, Juba to Garhi	...	...	1,12,667
	Total British	...	10,95,608

Kashmir section (113 miles).

9 miles Garhi to Domel	...	...	1,01,891
105 ,, Domel to Srinagar	...	...	12,70,411
	Total Kashmir	...	13,72,302
	Grand Total	...	24,67,910

CHAPTER V.

Working Expenses.

27. The percentage of working expenses to gross receipts, as estimated by Mr. W. J. Weightman, may be accepted, *viz.*

55 per cent. on the broad gauge section from Serai Kala to Adbottabad, if worked by the North-Western railway.

70 per cent. on the metre gauge or 2½ feet gauge section from Abbottabad to Srinagar.

On the Banihal route I estimated 66 per cent. on the 2½ feet gauge, but on the Abbottabad route, coal will be dearer, and the maintenance of the 92 miles from Juba to Baramulla, is likely to be quite as expensive as in the Chenab valley owing to the friable nature of the hill side.

CHAPTER VI.

Financial Prospects.

28. Serai Kala to Abbottabad on 5½ feet gauge.			
Gross earnings	...	...	7,83,232
Deduct working expenses 55 per cent,	...	...	4,30,771
	Nett earnings	...	3,52,461

Or 4.91 per cent, on an estimated outlay of Rs. 71,75,352 for construction.

Abbottabad to Srinagar on metre gauge up the left bank of the Jhelum river,			
Gross earnings	...	...	16,84,678
Deduct working expenses 70 per cent	...	...	11,79,274
	Nett earnings	...	5,05,404

Or 3 per cent. on an estimated outlay of Rs. 168,46,936 for construction.

Or Abbottabad to Srinagar on the metre gauge up the right bank of the Jhelum river,

Gross earnings	...	...	...	...	16,84,678
Deduct working expenses 70 per cent.	...	...	...	...	11,79,274
Nett earnings					5,05,404

Or 2.72 per cent. on an estimated outlay of Rs. 185,55,972 for construction.

Or Abbottabad to Srinagar on the 2½ feet gauge up the right bank of the Jhelum river,

Gross earnings	...	...	...	...	16,84,678
Deduct working expenses 70 per cent.	...	...	...	...	11,79,274
Nett earnings					5,05,404

Or 3.18 on an estimated outlay of Rs. 158,71,250 for construction.

29. If this line of railway is to be built gradually, out of the annual surplus income of the State, there will be no need to borrow any money and to incur interest on capital.

CHAPTER VII.

Political Considerations.

30. There is a great deal of truth in the remarks of Mr. W. J. Weightman on this subject, although he views every thing in a commercial spirit and thinks that as every one must be guided by the same light, the Durbar ought to adopt the cheapest scheme which may promise to be remunerative.

31. The Jammu and Kashmir State Council is, however, likely to be influenced by other considerations than that of making money, such as placing the welfare and benefit of the State and its people to be a paramount duty, as holding the convenience of the Administration and the fostering of trade to be next in importance, and as having a strong aversion to the borrowing of a large sum of money in the market, which would give the lender a certain amount of power, and enable him to exercise some pressure in regulating the affairs of the State.

The interference may not be active, but the pressure would be felt all the same and is a burden which the Durbar would shrink from incurring. The latter is always ready to spend its surplus funds for the improvement of the State and people, but it would rather see some tangible value for this expenditure than throw its money away in the payment of interest.

It would seem desirable to retain a portion of its revenue in hand to meet emergencies and exceptional demands, which may arise at any time, such as caused by famine, earthquakes &c.

32. Much will depend upon the degree of urgency which may be attached to this proposed railway by the Government of India. The idea of a line into Kashmir took root some 15 years ago, when the mind of the Indian public was disturbed by the prospect of an invasion over the Northern Frontier, and it was thought desirable to have prompt means of collecting a large force of troops into this basin and of securing an advanced base for Military operations, both defensive and offensive.

The holding of this position would have the effect of blocking the path of an enemy's advance in this direction, either to Rawalpindi fortress or to Lahore, the capital of the Punjab.

Since that time the mind of the Indian public has become more settled and is more at peace than before, though the conditions of the country have not altered, and the possible intentions of an invading enemy are just as incalculable as before.

33. If this Railway be considered by Government of vital importance to the security of the Indian Empire, the sooner it can be undertaken the better, and the Durbar would no doubt be willing to waive its prejudices and to join the Government of India, in an earnest effort to carry out the work.

At the same time, it would naturally expect that on this Imperial ground the Government of India, would lend its financial aid and support to borrow the required capital, and to refund the money in course of time.

34. Should the Railway, however, be considered to be of value only for the benefit of the State and people, and the Durbar be left to undertake it from its own resources, and be given a free hand in selecting the route, as appears to be the present intention of the Government of India, the Jammu and Kashmir State Council might prefer to make this line gradually out of its annual surplus income, and so spend this money upon actual construction and not upon the payment of interest.

By this course of action, the Durbar would retain its freedom and incur no risk, though 10 years would probably elapse in the construction first of a cart road upon a railway alignment with railway gradients, curves, bridges, and tunnels, at the end of which period, the growing finances of the State may improve to an extent which may enable the Durbar to lay the rails, build the stations and to provide the equipment and rolling stock in the next 10 years.

35. In the meanwhile, should another disturbance arise, and the mind of the Indian public be again agitated by rumours of an expected invasion over the Northern Frontier, both the Jammu and Kashmir State and the Government of India, can re-consider the position and be guided by the then circumstances. A large body of troops with animal transport and Military stores could be marched up the existing cart-road at anytime from both Rawalpindi and Abbottabad into the Kashmir valley. The necessary supplies can be collected here from local sources. It will depend upon the progress and condition of the new cart road under construction, whether its completion and conversion into a railway should be urged on with all speed. It would be well, however, to consider now how the money for this purpose can then be raised. As the Durbar will probably not be in a position to do so unaided.

CHAPTER VIII.

Comparison of the Abbottabad and Banihal routes.

36. *Engineering.*—It should be borne in mind that while Mr. W. J. Weightman contemplates widening the Jhelum cart-road, and laying the Railway and road way side by side on the left bank, I consider such a proceeding to be dangerous to the stability of the hill slopes, and propose instead to leave the cart-road intact and to locate the railway along the right bank of the Jhelum river, between Domel and Baramulla, as first recommended by Mr. J. A. Anderson.

It may readily be conceded that this Abbottabad route is superior to that by Banihal in many respects. Its main advantages are in the less rise and fall, the absence of long tunnels, the less snow encountered, the flatter gradients, the greater length of firm soil, and the less cost to the State.

37. *Traffic.*—While the Abbottabad route has greater carrying capacity from the flatter gradients, it has less local traffic at its upper end in Kashmir, and more local traffic at its lower end in Hazara. It serves only a corner of the Kashmir State and omits the State of Jammu altogether. The through traffic in passengers and goods will naturally suffer from the longer circuitous route and from the consequent higher charges, especially

in that portion which may exist between Srinagar and Jammu, the two capitals both up and down.

The question of future traffic and of the proper gauge to be adopted, affects both lines. If required for Military transport, a metre gauge is imperative. If, for the use of public traffic only, a 2½ feet gauge may suffice in the first instance, with the proviso that should greater capacity be required hereafter, a second 2½ feet gauge line may be constructed on the other route.

38 *Financial*.—The advantage is distinctly on the side of the Abbottabad route. The construction of the Banihal route of 2½ feet gauge is estimated to cost Rs. 254½ lacs while that of this Abbottabad route of same gauge is estimated at Rs. 230,46,602. Further, while the Kashmir State must provide the entire funds in the former case, it need only provide about one-half the outlay in the latter case, owing to one-half the length being situated in British territory.

The nett traffic returns are, on the whole, about equal, for, while the lower section from Serai Kala to Abbottabad, through the Hazara district is the most remunerative, that from Jammu to Riassi through the Jammu province, will likewise pay well, if, as expected, a large coal traffic arises from the Ladda coal field.

39. *Military*.—For local purposes such as reliefs etc., the advantages are balanced, for, while on the one hand the line connects the enlarged Cantonment of Abbottabad, on the other, it connects the Cantonment of Satwari at Jammu, which holds a considerable force of Imperial service troops of all arms, and from which reliefs to Kashmir and Gilgit are constant. For Imperial purposes, that is, the movement of troops to the valley, on an emergency, both lines are likely to be useful in the carriage of Military stores from the arsenals and depôts.

40. *Political*.—On this ground the advantage is clearly on the side of the Banihal route. It is shorter and quicker and lies wholly in Kashmir territory. It opens up the central part of both provinces of Kashmir and Jammu and is likely to be the most useful to the State and people through the direct connection between the two capitals. The jurisdiction of the railway will remain in the hands of the Jammu and Kashmir State, while on the Abbottabad route, it would probably have to be ceded to the Government of India, owing to one section of the line being policed under British rules.

41. *The Government of India* is probably favourable to the Abbottabad route, as opening up the fertile and prosperous Hazara district, as connecting by rail the large and improving Cantonment of Abbottabad, as serving the Kaghan route to Gilgit and Central Asia, and as adding to the earnings of the North-Western Railway through the increased lead of traffic. This line would also shorten the approach to the Black Mountain, and would strengthen the hold of the British Government upon the turbulent tribes of the Indus Valley between Derband and Bunji.

42. *The Kashmir State*, on the other hand, may naturally prefer the Banihal route, not as Mr. W. J. Weightman observes from more or less personal, or it might be said, sentimental reasons, but on local grounds of public utility and economy of carriage.

It is hardly correct to say that were the Jhelum valley cart road and railway placed side by side, the annual maintenance charges of the former would be saved. The up-keep of the cart road would remain a debit to the State, the maintenance charges of the whole being divided between the railway and the cart road. If, as urged before, the cost of construction of the railway by any route be defrayed gradually from the annual surplus income of the State, the borrowing of funds to meet the outlay can be avoided and no branch of the State revenue need be hypothecated for railway purposes.

CHAPTER IX.

Conclusion and Recommendations.

43. It is not easy to strike a correct balance between the merits and demerits of these two routes, the conditions are so various and some are even opposed from the Imperial and local points of views.

To my mind the choice depends upon two primary considerations,

I. Is prompt construction so urgent or necessary that the money for it must be borrowed?

II. Or can construction of the railway be defrayed out of the annual surplus income of the State, and be spread over a period of 20 years?

44. If the money for construction must be borrowed, it is plain that the risk of borrowing and eventually of refunding 254½ lacs of rupees, is too great a burden for the finances of the Jammu and Kashmir State to bear, and the Durbar must perforce select the cheapest route by Abbottabad, involving the least expense of construction to it. Should the Government of India agree to defray the cost of making the line from Serai Kala by Abbottabad to the border, the Durbar might agree to borrow Rs. 119 lacs in order to construct the extension of 2½ feet gauge, from the border to Srinagar along the right bank of the Jhelum river, the existing cart road on the left bank being left intact.

45. On the other hand, in a local point of view, there is no real need to press on the construction or to borrow any money. If this railway is required solely for the benefit of the country and people and the Durbar is to depend entirely on its own resources to supply the funds, the simplest plan will be to defray the outlay out of the annual surplus income of the State. There will be no risk to its finances, and the people of Jammu and Kashmir are prosperous enough to wait 20 years for the completion of the railway. The early improvement of a country is no doubt a most desirable object, but in this case there has been a wonderful rise during the past few years.

In this case the Durbar may probably select the Chenab valley and Banihal route as the one most likely to best serve the country and people.

As said before, in my first report on the Eastern routes, this work could be undertaken in sections.

Firstly, construction of railway complete from Jammu to Tikri, 30 miles, with branch to the Ladda Coalfield, 10 miles.

Secondly, construction of metalled cart road 113 miles, from Tikri up Chenab valley to Islamabad, on the railway alignment with railway gradients, curves, and bridges and with temporary roads over the Surly and Banihal passes.

Thirdly, the laying of the rails on the new cart road from Tikri to the Surly gully and constructing the tunnel through this range.

Fourthly, the laying of the rails on the existing cart road between Srinagar and Islamabad 30 miles, and on the new cart road thence to Banihal 30 miles, including the construction of this tunnel.

Fifthly, the laying of the rails on the new cart road 60 miles long, between the Surly and Banihal tunnels.

46. The latest report on the Ladda coal field, by Mr. T. La Touche, Geological surveyor shows that there is a continuous seam of coal, containing at least Rs. 2,500,000 tons to warrant the working of the mine and the construction of the railway to it.

If the North Western Railway would agree to lease the coal field and to work the mine, the Durbar would be saved an outlay of Rs. 10 lacs and would secure its best customer for the coal. The approval of the Government of India and the consent of the Jammu and Kashmir State would be necessary

to such an agreement, and the terms would require thorough discussion.

An advantage to the Jammu and Kashmir State is that it would be relieved of the onus of working the mine, of which at present it knows nothing, and might be thus saved experiments which may end in failure.

One drawback would be that in the course of 20 years, this coal mine may possibly become exhausted and may no longer be able to supply coal for the working of Jammu and Kashmir Railway. Before this happens, however, the whole field will have been thoroughly explored and surveyed, and there is every prospect of one or more of the numerous existing outcrops turning out as well or better.

47. Our present experience of hill railways in India shows the necessity of proceeding with unusual care in the construction of a much longer line over worse ground.

The Darjeeling railway 51 miles long of 2 feet gauge, exposed to an heavy rainfall, is liable to frequent interruptions from landslips and subsidence of hill sides, which block the traffic.

The Nilgiri railway 17 miles long of metre gauge exposed to a moderate rainfall suffers in the same way.

The Peshin railway of $5\frac{1}{2}$ feet gauge exposed to a slight rainfall was liable to frequent interruptions from mud slips and a new line has been made instead.

The Kalka Simla Railway 60 miles long of $2\frac{1}{2}$ feet gauge, where the rainfall is moderate, has been more solidly built at high cost and is yet untried.

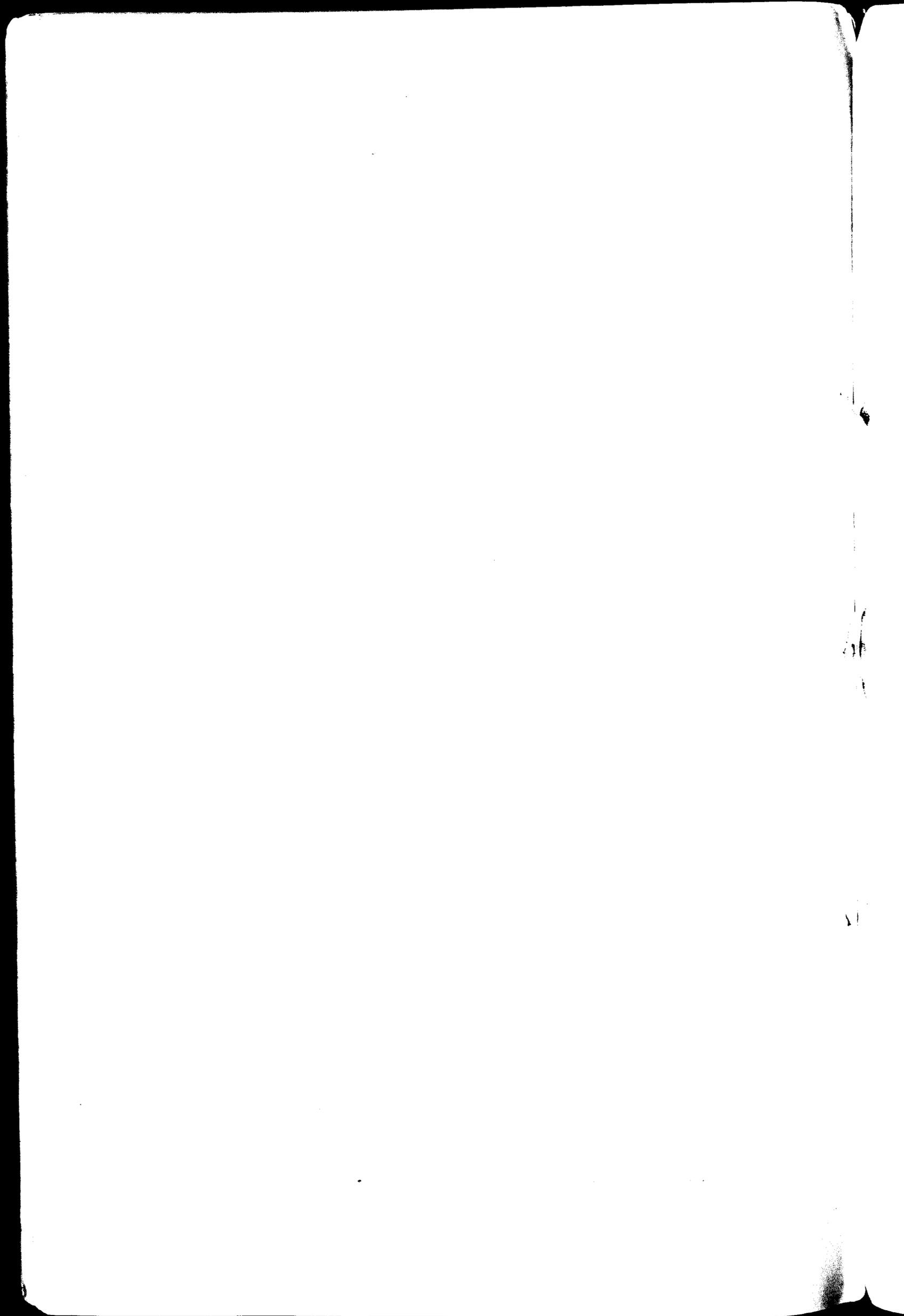
On the proposed Kashmir railway of $2\frac{1}{2}$ feet gauge, which is subject to a moderate rainfall, one main advantage in proceeding slowly with the construction will be that greater caution can be exercised. The Chief Engineer will have ample time to examine the hills and to secure the best alignment on the whole, he can make a cart road, first, to try the ground and not lay the rails until he has made sure of a sound base.

It would be different with a Chief Engineer, with large ready Capital at his back, who considers it incumbent on him to hurry through construction in the shortest time, he cuts through all difficulties and sometimes lands the line in dangerous situations, where maintenance afterwards is most expensive.

48. In closing this report, I would respectfully suggest that inquiry be made concerning the suitability of the Mono-Rail system for hill railways. Some years ago, a monorail of steep gradients and sharp curves was under construction in France, but it is not known here whether this line was completed, and nor what the result of working may have been. It was said to have the capacity of a metre gauge railway and to be capable of being worked by steam or electric power.

A line of this kind on a continuous girder, elevated upon standards at intervals, would not require any deep cutting in the hill side, would span every small water-course, and would not interfere with the drainage of the hill slopes. It was said to cost less than a Bi-rail line, and to cling to the hill face following the contours and sinuosities more closely, owing to the sharp curves admissible.

Such a line would apparently be less liable to cause landslips, or to be disturbed during heavy rains, and ought to be maintained more easily and at less expense.



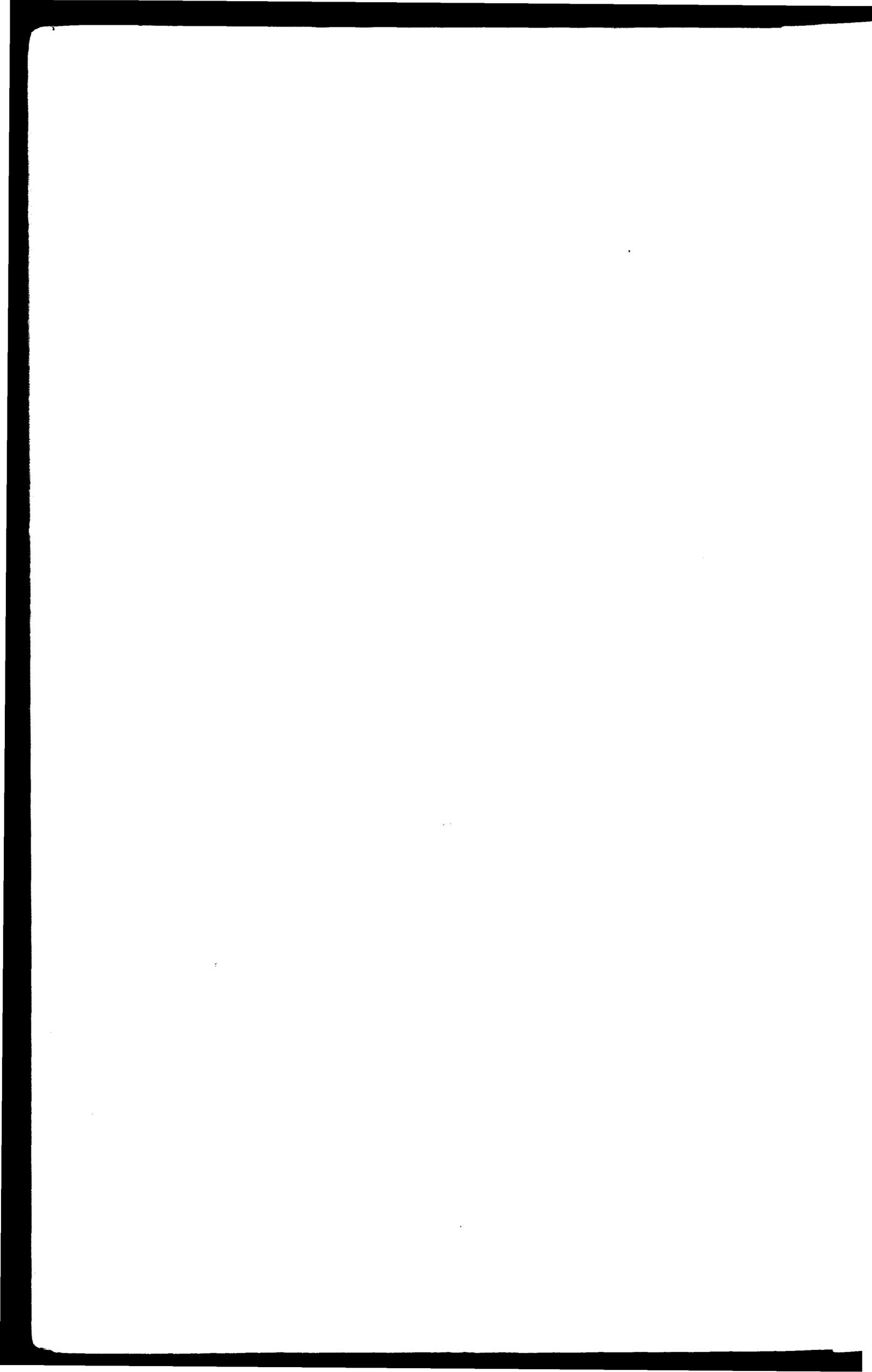
APPENDIX A.

Figures taken from Mr. W. J. Weightman's estimate of through traffic on the Banihal Route.

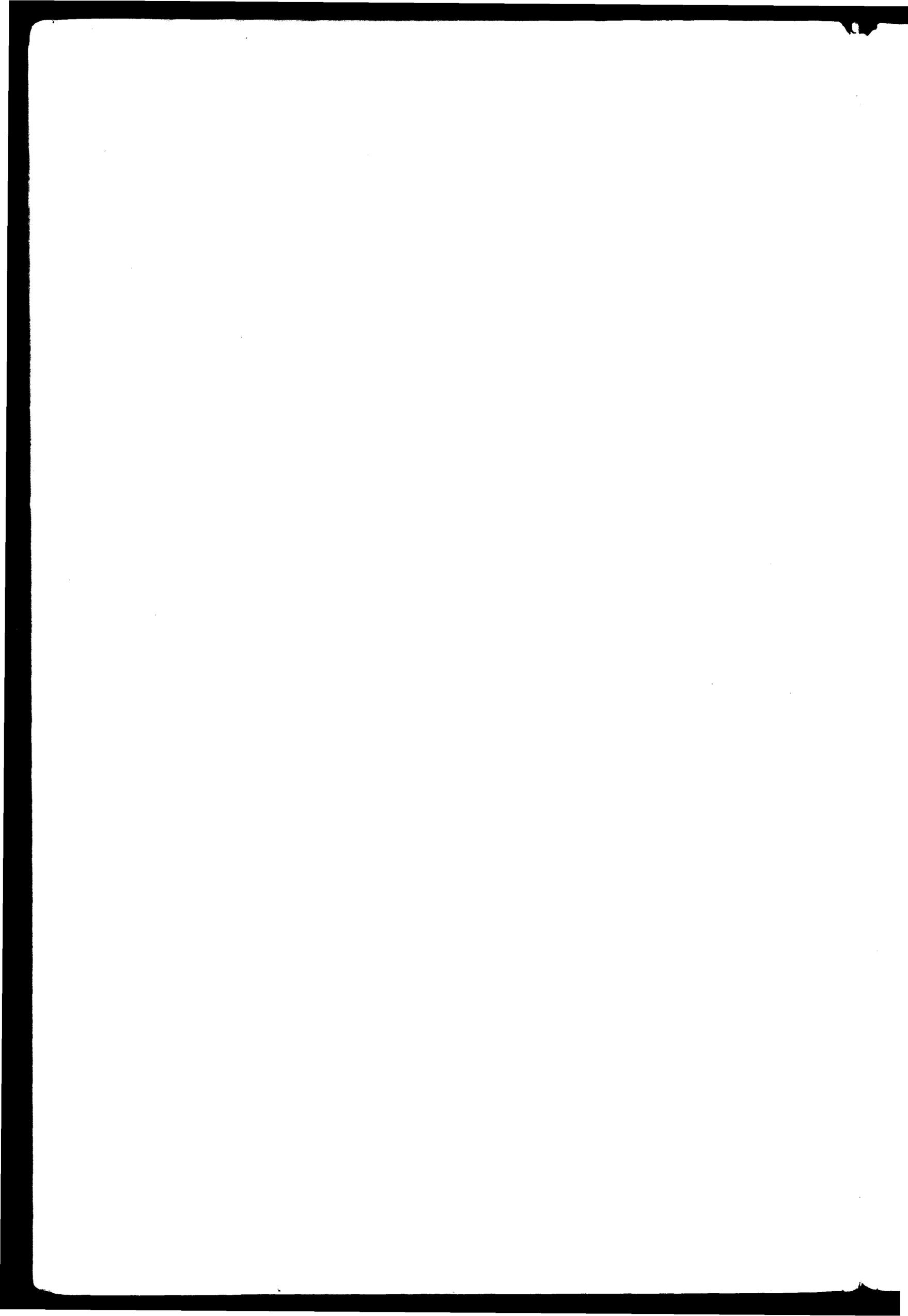
Banihal Route.		Abbottabad Route.	
143 miles Jammu to Islamabad	...	48 miles Serai Kala to Abbottabad	...
30 " Islamabad to Srinagar	...	23 " Abbottabad to Juba	...
173 " " " " " " " "	...	92 " Juba to Baramulla	...
52 " Tawi to Wazirabad	...	30 " Baramulla to Srinagar	...
225 Total miles Wazirabad to Srinagar	...	193 miles	...
		137 " Wazirabad to Serai Kala	...
		330 " Total to Srinagar	...
Passengers.		Passengers Serai Kala to Juba.	
	Rs. a. p.		Rs. a. p.
1st class 173 miles @ 3 annas	... = 32 7 0	78 miles 1st class @ 2 annas	... = 9 12 0
2nd " " @ 1½ annas	... = 16 3 6	" 2nd class @ 1 anna	... = 4 14 0
3rd " " @ ¾ annas	... = 4 0 6	" 3rd class @ ¼ anna	... = 1 3 6
Goods 173 miles @ 1½ pie per maund	= 1 5 7	Goods 78 miles @ 1 pie per mile per maund	... = 6 6 6
N.-W. Ry. Wazirabad to Tawi.		N.-W. Ry. Wazirabad to Serai Kala.	
	Rs. a. p.		Rs. a. p.
1st class 25 miles @ 1 anna	... = 3 4 0	1st class 137 miles	... = 8 9 0
2nd " " @ 6 pies	... = 1 10 0	2nd " " " " " "	... = 4 4 6
3rd " " @ 2½ pies	... = 0 9 9	3rd " " " " " "	... = 1 9 9
Goods " @ 6 pies per mile per ton	= 1 anna per md.	Goods 6 pies per ton per mile	... = 0 2 6½
Through Traffic to Kashmir.		Through Traffic to Kashmir.	
	Rs. a. p.		Rs. a. p.
2500 1st class @ 32 7 0	... = 81,093	2500 1st class @ 32 10 0	... = 81,562
3500 2nd " @ 16 3 6	... = 57,390	3500 2nd " @ 16 5 0	... = 57,093
73000 3rd " @ 4 0 6	... = 2,94,281	73000 3rd " @ 4 1 3	... = 2,97,703
Goods 1125000 mds. @ 1 5 7	... = 15,17,578	Goods 1125000 mds. @ 1 5 9	... = 15,29,296
N.-W. Ry. Wazirabad to Tawi.		N.-W. Ry. Wazirabad to Serai Kala.	
2500 1st class @ 3 4 0	... = 8,125	2500 1st class @ 8 9 0	... = 21,406
3500 2nd " @ 1 10 0	... = 5,687	3500 2nd " @ 4 4 6	... = 14,984
73000 3rd " @ 0 9 9	... = 44,484	73000 3rd " @ 1 9 9	... = 1,17,484
Goods 1125000 mds. @ 0 1 0	... = 70,312	Goods 1125000 mds. @ 0 2 6½	... = 1,78,711
Total	... = 20,78,950	Total	... = 22,98,239

DIFFERENCE.

2,19,289.









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