

On the 8th, 9th and 10th there was severe wind and snow at all points above Camp V.

Angtsering added that during his last two days' sojourn above Camp IV the weather was good, but a great depth of snow covered everything but steep rocks.

(Signed) GEO. WOOD-JOHNSON.

October 27, 1934.

Illustrations.

No. 1, U. Wieland. Nanga Parbat, N. face (greatly foreshortened).

No. 2, E. Schneider. Hindu Kush with Rakhiot Glacier.

No. 3, E. Schneider. *Silbersattel* from Camp VI.

No. 4, E. Schneider. Rakhiot Peak and Camp VII.

For other views of Nanga Parbat, see *A.J.* 18; 20, facing 307; and especially 44.

SOME GLACIERS OF UPPER CHITRAL.¹

By REGINALD SCHOMBERG.

THE valley of the Yarkhun river, which during its course is known as the Mastuj, Chitral, or Kunar, is no more than a rocky trough with many lateral streams. It rises near Wakhan, in the grassy slopes of Baroghil, but it depends for its water supply on the great glaciers that are almost wholly confined to its left side: and it is this left side, with its moraines, fans, and deposits that demonstrate the great part that glaciers have played in the present condition of the Yarkhun valley in Northern Chitral. In summer this river is a swift, turgid, black flood, while its affluents are equally unlovely.

Generally speaking, the rocky formation of the Hindu Raj and the Chitrali Hindu Kush do not lend themselves to glacier making, and in a region of great rock ranges and towering peaks, the glaciers are disappointing, for there is little chance of the snow accumulating on these perpendicular slopes, while the regular and heavy rainfall (to which I shall again refer) militates against any heavy deposits of ice and snow. The hanging glaciers are insignificant, the normal glaciers seem unusually small, and the visitor is disappointed in the somewhat non-Alpine appearance of the region. I certainly was. Perhaps I hoped for too much, but I am reluctant to think that the lack of glaciers in a country where one expects many can be wholly explained by the present era being one of glacial retreat.

At Warsum (Wassum), for instance, the fine glacier torrent flowed from a spectacularly insignificant ice and snow formation. It was only when we reached the Madod stream flowing into the left of the Yarkhun river, opposite the settlement of Shost, that I saw glaciers that would repay a visit. The stream in the early part of a July afternoon was a considerable torrent; we camped at Kand, a very

¹ See map, *A.J.* 46, facing 133.

small village high above the river, and some $2\frac{1}{2}$ miles from the Madod valley. Next day, with Daulat Shah of Hunza, who had a profound contempt for all Chitralis, and a local guide, we started for Madod. We began badly. Our guide led us, although protesting and reluctant, up the side of a mountain from which he assured us we should see all: and as he was the owner of the valley, we felt he ought to know and so we gave in. My own idea was to skirt the right-hand of the valley and so ascend to the glacier, to which Daulat agreed. We followed instead the proprietor, obeying the rule of trusting the local expert.

We toiled up and up to a height of 14,000 ft., and then poked our heads over and looked down on the Madod nala, to discover exactly what we expected—that we were right and the expert was wrong. We had to descend into the nala; tumbling down a steep hillside, no easy matter, but with Daulat as a guide (he had, of course, never seen the place before, but had the true hillman's instinct) we reached the bottom of the right side of the Madod valley.

The stream itself lay beyond, hidden between deep conglomerated cliffs. Above this, on the left, was some poor grazing and a little cultivation. We passed through the latter, then, climbing up the steep moraine, took an hour and a half to cross. A bitter wind blew out of a cloudless blue sky. Finally, in $5\frac{1}{2}$ hours we reached the top of the moraine and were rewarded with a fine view; then finding a sheltered place we were able to enjoy the spectacle in comfort.

The moraine was heaped up in the centre of the valley, but from its apex we found that it sloped away between ourselves and the glaciers in a deep trough. Although the whole valley was filled with the glacier, most of the ice, after casting up this moraine-mountain (for so it was), turned aside and flowed to the left where it was piled up high on the grassy slope. It was a strange spectacle to see the ice-sheet climbing up the greensward.

On its right, the glacier had left in its wake a high knife-edge of detritus which deepened the effect of the trough. The glacier immediately below us—that is, between the end of the valley and the moraine—was covered with stone and rubbish, but there was no sign of any water although we expected to find a small tarn.

Our attention was drawn to the head of the valley where, from a circle of abrupt and jutting peaks, fine glaciers flowed down from as many small couloirs, filling the bed of the valley with a clear broken mass of glittering ice. Between these flowing glaciers were hanging ones, the entire head of the valley being thus swathed in ice or snow. I estimated the length of this clear ice in the floor of the valley as 1200 yards long. Then it grew dirty as it sank lower, flowing between the old moraine and the left side of the valley.

The actual snow deposits were limited to the head of the valley. On the right, facing S.E., there was not a vestige of snow and the roads were peculiarly arid and barren. On the left was a good deal of grass and a few traces of rapidly melting snow. The lower half of the valley as well as the fields referred to above contained willow

and birch trees. There were no permanent inhabitants and the barley did not look very promising, but that was due as much to neglect as to the elevation, for we saw a horse calmly devouring the ripening crop and, although the guide drove it away, there was nothing to hinder it from returning. The next glacier visited was the Vedinkot and, on the way up the Yarkhun valley, we passed two or three others after leaving the Madod, but the river was impassable. Several of these glaciers were quite short, and wholly visible from the opposite or right bank. The Vedinkot or Chattiboi (a word which means 'lake-forming') flows N., and then turning N.W. reaches the left bank of the Yarkhun river flowing at its base. The snout of the glacier ends in perpendicular cliffs of clean white ice, with the river flowing below and lapping these ice-walls. All day and all night the crash of ice falling into the stream broke the silence: and when a large piece was detached there came a noise like thunder. The river, in consequence, was full of large blocks of ice, swirling and jostling together. A remarkable feature of the Vedinkot Glacier, which throughout its length completely filled the bed of its own valley, was that it was joined by the broad North Darkot valley with its own stream flowing in it, but the glacier of which was distant and had not advanced at all. In spite of this, on the left of this same valley, there were hanging glaciers and snow deposits of a considerable extent. The explanation of why this valley was not filled with a glacier like its fellow lies in the original shape of the Vedinkot valley. The steep icefall merged into an almost level sheet of ice, while the gradient suited the flow, continuance, and normal life of the glacier. The North Darkot, however, could not force its way down a longer and unsuitable course; the resistance and friction was greater than its momentum could overcome.²

The Pasu and Batura Glaciers in Hunza, the Western Aghias in the Tian Shan, and many other glaciers, which continue far down their valleys are largely indebted for their length to the gradient of the valley. Beginning with a steep icefall, but which gradually eases off, the flow of the glacier is moderated and the original momentum is diminished, while at the same time the ice stream can continue its course and preserve its identity far down into the valley.

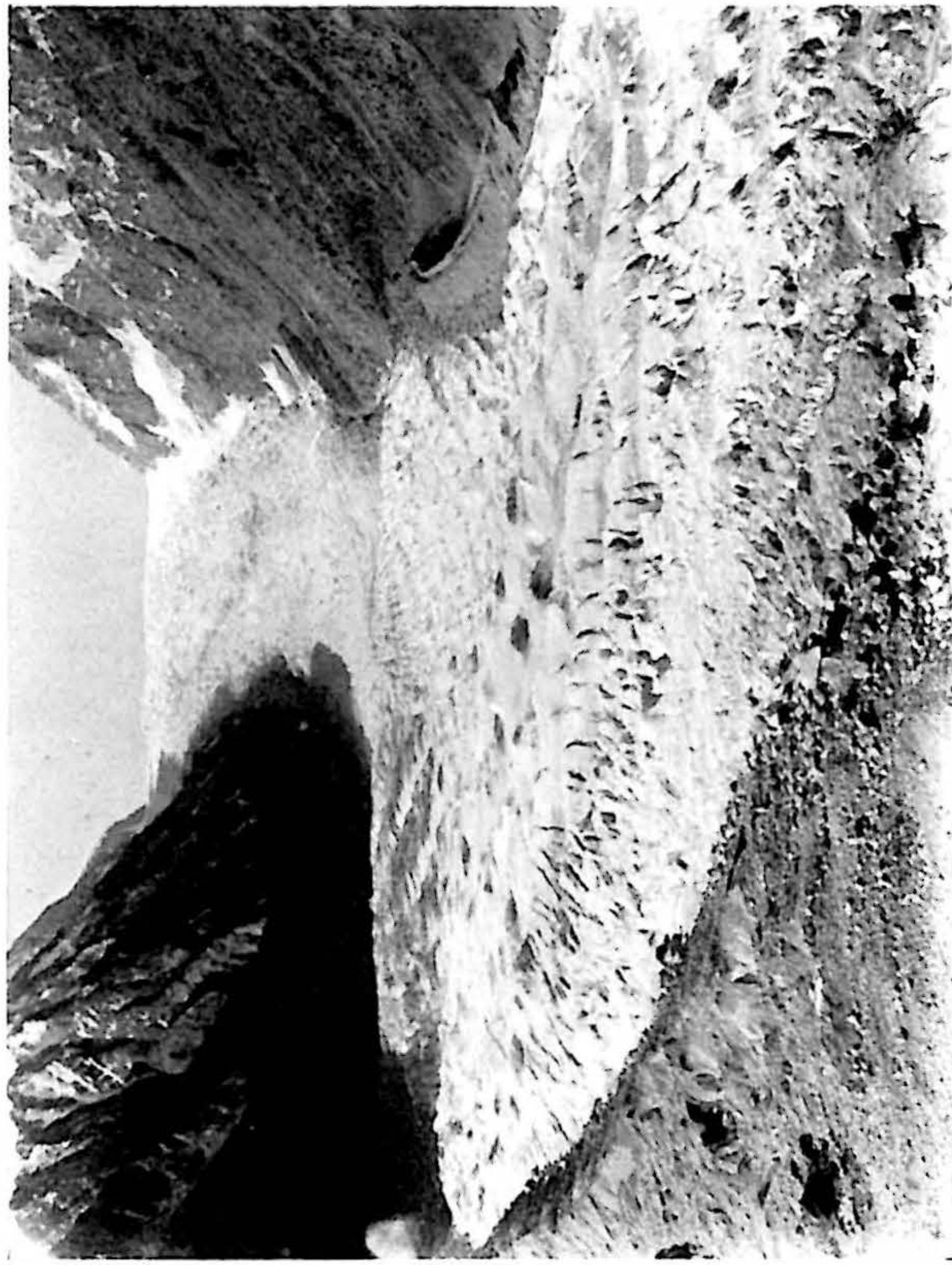
The action of the sun is also limited to the actual surface of the glacier, of which the edges are protected by the sides of the valley. Again, the liquefaction of the steep icefall is neutralized by the gentler slope lower down. Besides the reasons given there is also, in the case of the South Darkot Glacier, a real failure in the ice of recent years. Some time ago there was a route over the Darkot Pass, down the glacier, to Vedinkot. Then for a number of years

² The North Darkot Glacier flows *south* from the Darkot Pass, and should not be confused with the glacier flowing direct into the upper Yarkhun from the same pass: this latter is the Chigar Glacier.



CHIAN TAR GLACIER. NORTHERN OR UPPER CHITRAL.

[To face p. 100.]



Photo, R. Schomberg.]

THE VEDINKOT GLACIER. UPPER OR NORTHERN CHITRAL.



Photo, R. Schomberg.]

MADOD GLACIERS. UPPER CHITRAL.

it was closed. In 1932 it was again passable, which indicates a decrease in the glacier: when crossing the Darkot Pass by the Chigar Glacier I could see that the South Darkot was easy enough. My Wakhi yak drivers, stating they would be at their homes in Vedinkot in a very short time when taking this route, disappeared contentedly down it.

Near to Vedinkot was another glacier, the Pechutz or 'Hot Spring.' This small glacier was in a very large valley compared with its size, and suffers much from solar action on three sides, attacks from falling stones and lateral streams, and was quite a pathetic object, dwindled and shrunk in its too roomy bed. It was not wholly a case of a glacier having carved out a valley that it now fails to fill, for in this arid country a glacier is constantly exposed to outside influences which diminish it considerably.

But so far as Vedinkot went, the great glacier more than compensated for the failure of its neighbours to fulfil their rôle and bring their ice to the river bank. It was a splendid spectacle, this long wall of ice towering over the roaring river. We heard that on one or two occasions spectators had been killed by splinters of the ice-wall falling across the river; we were very glad that it did not happen to us.

So far as dimensions go the principal feature of Northern Chitral is the great Chiantar Glacier,³ the true source of the Yarkhun river. This great glacier is, at a conservative estimate, some 20 miles long with an average width of 3-4 miles. Its bulk is most impressive, but is seen to the best advantage from 10 to 15 miles off. Otherwise, it can hardly be called a beautiful sight. Interesting, no doubt, but its flatness and regularity detract from the general effect. The surface of the glacier is singularly smooth, due to the very gentle gradient of the flow. Naturally the glacier is broken by friction near its rocky banks, but in 1933 crevasses were few, while even mere superficial cracks were not numerous, and where I wandered on it, I could have driven over much in a light motor car. The Chiantar was a wonderfully clean glacier, the surface moraine being only abundant near the snout where there were quite a number of fast collapsing tables of immense size. I judged the glacier to be divided into three distinct parts. The head and snout were smooth and regular but, owing to a change in gradient, the centre was much broken by crevasses, yet, even so, much less than could have been expected.

A feature of the glacier was its consistency in width; from a point near its snout, or indeed from any neighbouring high ground, the whole glacier was visible, except for a small part at the head.

³ I have tried to find the meaning of the word 'Chiantar,' which many glaciers bear. In Burishashki, the language of Hunza, Nagir and Yasin, the word means 'spry, sprightly, smart,' but in rather a bad sense. What it means in Shina or in Khowar (Chitrali) I failed to discover.

The glacier has one large but unnamed tributary, 6 miles long, flowing in on the left from the S., and which joins the main ice-stream, but preserving its own individuality, flows on the left side of the valley. Between it and the main glacier is a black band of moraine which is most conspicuous throughout its length. This tributary glacier joins the main one 5 miles from its termination in the Yarkhun river.

As I have said, I found it easy to walk over the glacier; of this I did a great deal. I also crossed it with yaks about half a mile above its snout, and experienced little trouble except in getting on and off. I left slightly disappointed with the spectacular effect of this great ice river. The sides of the valley were monotonous and low, so was the smooth and tranquil sheet of ice; it was only by the effort of remembering its great bulk that I kept my interest alive. This vast ice river was, in fact, rather deadening.

The Chiantar Glacier appeared to me to be advancing very slowly. The Yarkhun river was quite unfordable anywhere, at any time, by day or night, though we watched it most carefully, since crossing the ice meant a considerable *détour* for all of us, and we were anxious to find a ford. All three glaciers, the Madod, Vedinkot, and Chiantar, were slowly advancing, but the other glaciers seen were small, generally static or retreating.

From talking with the people it was evident that cloud-bursts are a feature of the country. I was shown tracts of territory near Wassum, for instance, where good arable land had been ruined by summer floods. In some places I saw settlements destroyed by the same cause, and the peasants attributed the damage to the heavy rain. In the Baroghil we heard alarming tales of the heavy and continuous downpours; we only escaped such a deluge by the happy accident of leaving the day before.

This heavy rain must greatly affect the glaciers and especially retard vegetation; I think that this interference with the normal life of a glacier accounts for the apparent vagaries of the ones in Chitral. I do not pretend to any elaborate study of the Chitrali glaciers; but it was clear that the smaller glaciers contrasted strangely with their neighbours, and I believe that they had suffered from the effects of a recent cloud-burst, having lost an unusual quantity of their ice, which they were in the less favourable position to replace. I have often watched a sudden storm on a glacier and even a comparatively light shower achieves a great deal. The warm rain corrodes the ice, stones are brought down with a clatter, and ice, rock and much else go rattling down, causing a marked change in even a small formation. It can hardly be argued that the Chitrali glaciers of the upper Yarkhun, whether of the Hindu Kush or Hindu Raj—two names for one mountain group—are different from others, and yet the ice deposits exhibit a strange inconstancy and waywardness. All I suggest is that the Chitrali glaciers must be modified by these rain-storms which have so greatly altered the formation of the valley itself.