

THE
ALPINE JOURNAL.

FEBRUARY 1903.

(No. 159.)

TWO ASCENTS OF THE SOUFRIÈRE.

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(Read before the Alpine Club, December 15, 1902.)

THE ascent of a mountain only about 4,000 ft. high, and which, moreover, was formerly crossed by a trail frequented ever since the days of the aboriginal Caribs, does not appear at first sight a very promising subject for a paper for the Alpine Club. The case may, perhaps, be a little altered when the mountain in question is a volcano whose recent eruption has devastated the whole neighbourhood, entirely altered the former appearance of the slopes, filled some of the valleys at its base with red-hot sand to a depth of perhaps 200 ft., and killed nearly 2,000 persons. Moreover it should be explained that the mountain is really about 15,000 ft. high, as the sea from which it rises is over 10,000 ft. deep.

I will not attempt to repeat what has already appeared in two reports to the Royal Society under the joint names of myself and Dr. Flett, but will endeavour briefly to describe our ascents from the mountaineering point of view.

By the kind intervention of Sir R. Llewellyn, the Governor of St. Vincent, Mr. Richards, of Kingstown, had very kindly placed at our disposal his charming little country house, Sea View Cottage, at Petit Bordel, near Château Belair, a village on the western or leeward side of the island, just outside the zone of devastation. The house was situated on the top of a projecting headland, with a full view of the Soufrière across a bay rivalling in beauty that of Naples. At the foot of the hill was the little village of Château Belair, chiefly composed of negro huts, nearly all of them standing each in its own garden, full of tropical vegetation, while behind were hills,

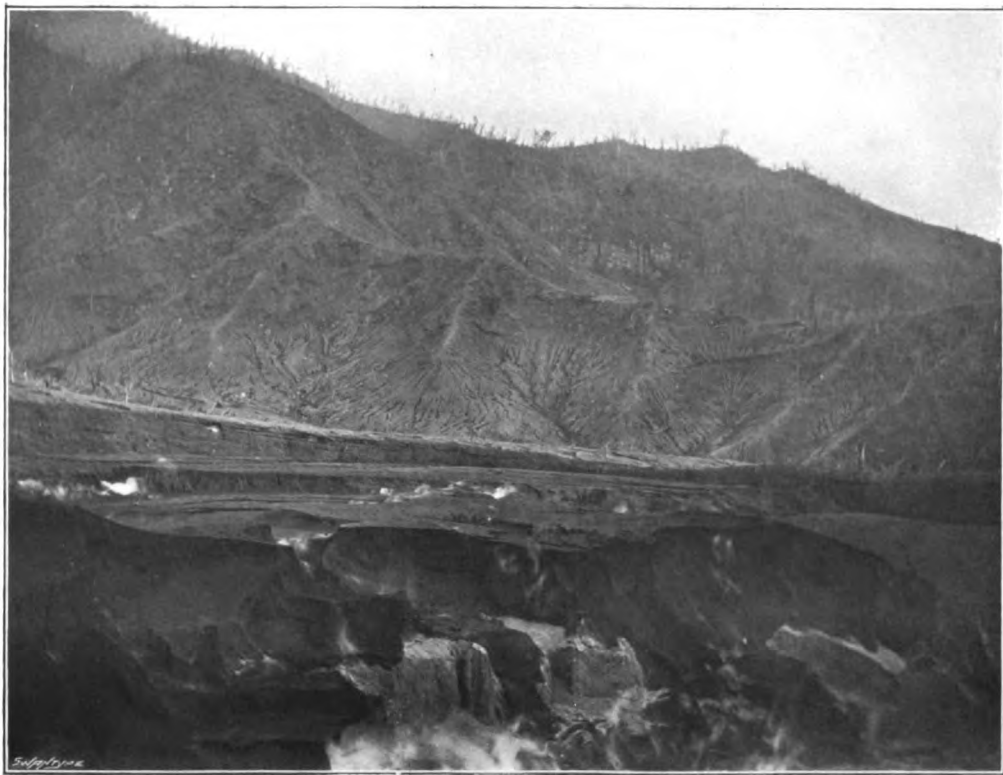
which from their rugged shape almost deserved the name of mountains, though covered to their summits with tropical forest. Between us and the base of the Soufrière were two ridges partly under cultivation with arrowroot and sugar-cane, as were most of the low grounds, and to these ridges Château Belair had owed its preservation during the eruptions.

We were fortunate in having with us Mr. McDonald, a neighbouring planter, the estates of whose family had suffered severe damage, and Mr. Powell, the curator of the Botanical Gardens of St. Vincent, under the Imperial Department of Agriculture, both of whom knew the mountain intimately before the eruption, and Dr. Branch, a local medical practitioner; numerous boatmen and porters, all black or coloured, completed our party. The hot and rainy season had just begun, and the top of the mountain was almost constantly covered with a dull, heavy rain-cloud. We waited several days in hopes that it would lift, and at last, on the weather looking a little better, we made the attempt.

This being the leeward side of the island, the water is usually calm, so that most of the traffic is habitually carried on by boat; in addition to which the road, such as it was, had been carried away during the eruption, so there was no choice.

We accordingly left Château Belair soon after daybreak in two boats—or rather canoes—each dug out of a single log of wood, but with a concession to civilisation to the extent of a gunwale attached to the top all round. We delayed a few moments to get a photograph of a boy fishing off a catamaran, or raft of two logs of wood joined by a few boards. Our crew were stalwart blacks, descendants of the liberated negro slaves, who were formerly imported from Africa to work the plantations. They jabbered rather volubly in broken English, and were amusingly self-conceited. I heard one loudly declaiming in a street row, ‘Me gentleman bred and born. If me a bit coloured, me very comely.’

Soon we arrived at the site of the village of Wallibu. This formerly consisted of a long row of negro huts, with gardens and palm trees, on a low terrace or foreshore. On the morning of the eruption, apparently from a landslide due to an earthquake, the whole foreshore slid down into deep water, leaving no trace behind. A considerable bluff, which had stood behind it, still remained. It consisted of imperfectly consolidated volcanic ash, the production of former eruptions, and was covered with a fresh layer several feet thick of similar ash just deposited. The waves were undermining the



THE WALLIBU VALLEY, JUNE 1902.

base of the cliff, which kept frequently falling, and in the section thus laid bare the junction of the new ash with the old was readily visible by the remains of the vegetation recently overwhelmed. A new beach was thus being formed, on which we landed, and, selecting a place which seemed less inclined to fall than the rest, we scrambled to the top of the bluff. Here had been the factory belonging to the plantation. The chimney still stood; the rest of the buildings were a mass of unrecognisable ruins and covered with several feet of ash. This, when first visited soon after the eruption, had been described as a rolling surface like drifted snow. Portions still remained in this condition, but the greater part had been much eroded and washed away into deep furrows and gullies by the tropical rains. Here were abundant objects of interest, and I began to take photographs, but soon found this impossible without unduly delaying the party, so I reserved this for a future visit, when I gave the low ground a day to itself. We had taken the precaution of landing at the N. side of the mouth of the Wallibu, but some smaller streams in the same watershed still remained to be crossed before we fairly arrived at the foot of the Soufrière. Their old beds had been deeply filled with ash and sand, but erosion by the tropical rains had been rapid, and already deep gulches and miniature cañons had been formed in the soft strata, partly opening out the old channels, but not altogether, as here and there they had cut entirely new ones in the old tuff. However the morning was fine, no water was coming down, and we crossed without difficulty, though there were places where an ice axe would have been handy to make a few steps. All this low ground had been covered with flourishing plantations with luxuriant tropical vegetation; now not a living thing was to be seen; all was either burnt up or buried. Soon we got fairly on to the slopes of the mountain, and here a new feature presented itself: the ascent was entirely along a series of knife ridges of rather friable material, generally with a deep chasm on each side. I know of nothing exactly like them. The boulder clay on the top of the sea cliffs at Filey Brigg and Flamborough Head has some resemblance, also some old weathered moraines in the Kanderthal and on the S. side of the Col du Géant; but perhaps the nearest approach is the outer slope of Somma, though in this case the rain is not so torrential, and the sides of the gullies not so steep. The whole had been covered with ash or sand during the eruption, but the rain rills had removed a great part off the slopes, while the edges between mostly preserved their covering to

the width of a foot or two. Thus in most places there was an easy, if not always very safe, path, but here and there the whole was rotten or had given way altogether. Towards the top also there was a space, perhaps 200 yards wide, that had to be crossed. Here the slope was not very steep, but the ash was of a more tenacious or clayey character than elsewhere, so that the water could not get away. The result was a tenacious mass, in which we sank deeply, and I was reminded of a brick field in winter, only the mud was warm rather than cold. I have once or twice come across snow in bad condition nearly as objectionable, but as this was during descents, not ascents, it did not matter. However we went on; the morning's promise of fine weather did not hold out, and we were soon in the cloud which in the rainy season envelops the top of the mountain for weeks at a time. The Trade Wind is an inestimable blessing on the low grounds in the tropics, but get over 3,000 feet high, right into the middle of it, and see how you like it as it drives the torrential rain right at you. My broad-brimmed pith helmet, intended for protection more against sun than rain, was repeatedly blown off and rendered so unserviceable that I was glad to give it away on the return; my mackintosh was useless and blew up round my head; my coat hung in dripping festoons; a pocket compass and clinometer was discovered to be full of water: fortunately my camera was in a water-tight tin case, so that it came to no harm, though it was impossible to use it. Eventually we got to the top and stood on the rim of the crater, but could see nothing, as all was full of mist and rain. Then the fog lifted a little, and for a few seconds we got a view of the interior of the crater. It is a vast pit about a mile in diameter, with the upper part gently sloping.

Before the eruption these slopes were clothed with dense tropical vegetation; now this was all destroyed by a layer of ashes which had been in a great part washed down by the rain. Lower down the slopes were steeper—in fact, naked precipices composed of beds of old volcanic materials, mostly tuff and such other fragmentary rocks, but with one or two beds of lava. Formerly a large lake existed here, as in so many craters, and had risen to within a few hundred feet of the lip; but this had been discharged early in the eruption, and now the crater was above 1,000 feet deep, and empty nearly to the bottom, but three small ponds had already formed, and one of them was boiling and discharging steam.

The fog closed in again before I had time to get a photograph, and we had no better luck on a subsequent ascent



ROZEAU DRY RIVER FLOWING WITH BOILING MUD.

from the other side. There is a smaller crater at the N.E. side of the large one, at the opposite side to which we had ascended, and some of the party tried to get round the lip to ascertain whether it also had been in eruption; but the ridge was very narrow, and proved to be slippery and dangerous, so they returned. While they were away I asked our head man whether anything lived up there, thinking of birds or animals. 'Yes,' he said, 'there was a mermaid who lived in the lake; she was very large, with a head like a woman and tail like a fish.' He had never seen her, but had heard her roar. Some Englishmen had launched a catamaran on the lake and annoyed her and killed her child, and now she was letting them see what she could do. By this time the other men had come back, and as it was blowing and raining hard, not to mention that we were in a thick cloud, we were all glad to beat a retreat. We struggled through the clay patch without much difficulty, and got well on to the knife edges. About half-way down we saw some magnificent explosions in a valley at the foot of the cliff of several hundred feet high on which we stood. The red-hot ash had accumulated chiefly in the valleys and ravines, and the heavy rain of the afternoon in descending had come in contact with the ashes, which still retained a great deal of heat. The stream appeared to undermine the banks of new ash which fell into the water, and the boiling water and mud were thrown high into the air with great clouds of steam and ash, which were caught by the wind and carried out to sea. Later on we studied these phenomena at leisure on the low ground.

The falls of hot sand dammed up the streams, and the water, accumulating behind the obstruction, eventually gained the mastery and came down in gushes of boiling mud.

One river in particular, which we had crossed without difficulty in the ascent in the morning, when it was dry, was now full of boiling mud, and we were afraid we were cut off and should have to wait some considerable time; but our men felled some trees which had been killed by the eruption, and made a bridge on which we crossed. Soon afterwards a larger gush of mud carried it away, but by that time we were safely on the further bank. Thus we got to *terra firma* on the low ground and proceeded to lunch. We were wet through and covered with mud, but none the worse for our adventures, and the Soufrière seemed to have given us all wonderful appetites.

No true lava was discharged during this eruption, but

instead enormous quantities of red-hot sand filled the valleys, as mentioned above. The valley of the Rabaka River, on the windward or E. side of the mountain, was before the eruption a narrow ravine. It was filled in places to a depth of 200 ft. That of the Wallibu, on the leeward or W. side, was wider; but in it too the deposit was in places 80 ft. thick.

The particulars of the action and reaction between the water and hot ash are given in detail in a report to the Royal Society by Dr. Flett and myself.

We afterwards paid a visit to Martinique, with a view to ascending Mont Pelé.*

On arrival at Fort de France we found that the devastated area to the north of the island was still almost entirely unoccupied. The greater part of the inhabitants of St. Pierre and the neighbourhood had been killed by the eruption, and the few survivors were only returning by slow degrees. It was therefore impracticable to make our base of operations on land near the scene of eruption. Fort de France was too far away to be available, except at a ruinous expenditure of time and money in going to and fro. It was therefore determined to engage a sloop, provision it, and live on board, moving by day to any point where landing was desirable, and retiring at night to some safe anchorage within reasonable distance. We devoted our first day to an examination of the ruins of St. Pierre, and in the evening we moved about 2 miles S. along the coast and spent the night at anchor off Carbet, just at the limit of the area of devastation, at a spot commanding a full view of the mountain. Next morning we returned to St. Pierre, and moored the sloop to one of the buoys at the north end of the town. Dr. Flett landed and further examined the ruins, while I remained on board and took photographs of the magnificent cauliflower masses of dust and steam which were frequently ejected from a great triangular fissure near the top of the mountain. Later in the afternoon we sailed further N. along the coast, still taking photographs of Mont Pelé, which was clearer that day than we ever saw it before or after, and showed to great perfection the deeply eroded valleys with which its slopes are scored. They much resemble those in corresponding position on the slopes of the Soufrière in St. Vincent, and appear to be formed in the same way in strata of similar composition, viz. fragmentary ejecta from the volcano which had consolidated

* The more correct name is La Montagne Pelée.

to form soft tuffs, and had subsequently been eroded into their present forms by ordinary atmospheric agencies.

We returned and sailed slowly S. past the base of the volcano, witnessing and photographing many small explosions and their cauliflower clouds of dust, and thus twice crossing the track of the eruption which took place later. We anchored, as before, off Carbet, and watched the sun set behind the clouds of ashes ejected by the volcano. When approaching the horizon and thus viewed, the sun appeared a sickly yellowish-green, and so pale that it could be looked at with the naked eye without discomfort. Later on, after sunset, the gorgeous after-glow appeared, and the thin clouds in the western sky were lit up with most brilliant red, beginning perhaps 30° or 40° from the horizon, while the part below still remained yellowish-green. Later still, as the sun sank further below the horizon, the yellowish-green area sank also, and only the reds remained, till they too sank out of sight, and gave place to the light of a brilliant three-days-old moon. We had sat on deck absorbed in watching this superb spectacle, and were just going to begin supper, when one of us, looking towards Pelé, said, 'That cloud is different from the others. It's quite black, and I'm sure it's coming this way.' A few moments' examination confirmed this, and, the captain's attention being called to it, we all, passengers and crew, heaved up the anchor as quickly as possible, and set all sail. The black cloud had meanwhile rolled down the side of the mountain on to the sea and came rapidly towards us. We had not moved a moment too soon. The upper slopes of the mountain cleared somewhat, and some big red-hot stones were thrown out; then I saw the triangular crack become red, and out of it poured a surging mass of incandescent material, reminding us of nothing so much as a big snow avalanche in the Alps, but at a vastly different temperature. It was perfectly well defined, did not at all tend to rise like the previous cauliflowers, but flowed rapidly down the valley in the side of the mountain which had clearly been the track of previous eruptions, till in certainly less than two minutes it reached the sea, and was there lost to view behind the remains of the first black cloud, with which it appeared to coalesce. There and on the slopes of the mountain was doubtless deposited the greater part of the incandescent ash, while the steam and gases, with a certain portion of still entangled stones and ash, came forward in our direction as a black cloud, but with much greater rapidity than before. The sailors were now alarmed, nay, panic-stricken, got out the

oars and pulled for their lives. Meanwhile the cloud came nearer and nearer; it was well defined, black, and opaque, formed of surging masses of the cauliflower type, each lobe rolling forward, but not all with one uniform rotation; bright scintillations appeared, some in the cloud itself, and some like little flashes of light vertically between the cloud and the sea on which it rested. This was clearly the phenomenon described by the survivors in the St. Vincent eruption as 'fire on the sea,' occurring in the black cloud which overwhelmed the windward side of that island. We examined them carefully, and are quite clear that they were electric discharges. The scintillations in the body of the cloud became less numerous and more defined, and gradually took the form of vivid flashes of forked lightning darting from one part of the cloud to another. The cloud rapidly gained on us. When it had got within perhaps half a mile or a mile—for it is difficult to estimate distances at sea and in a bad light—we could see small material falling out of it in sheets and festoons into the sea, while the onward motion seemed to be chiefly confined to the upper part, which then came over our heads and spread out in advance and around us, but left a layer of clear air in our immediate neighbourhood. It was ablaze all the time with electric discharges.

As soon as it got overhead stones began to fall on deck, some as big as a walnut, and we were relieved to find that they had parted with their heat and were quite cold. Then came small ashes and some little rain. Eventually we gained the harbour of Fort de France unhurt, and the proposed ascent of Mont Pelé next day, for which men had already been engaged, was abandoned. The cloud was also noticed at Fort de France. It was described as like those in the previous eruptions, but two unbiassed observers, who had seen it and that of May, declared this was the larger of the two.

Our limited time was now coming to an end, but on leaving for Dominica two days later we were able, from the deck of a steamer, to make some examination of the slopes of the mountain down which we had seen the incandescent avalanche descend. The whole district from just beyond St. Pierre to near Prêcheur, a distance of about 4 miles, was covered with a deposit of light grey ash of varying thickness, perhaps averaging a few inches, but evidently much deeper in the valleys of the Rivière Blanche and Rivière Sèche, which descend from the mountain about two miles beyond St. Pierre, and drain the slopes below the

large fissure out of which we saw the eruption descend. The water of these rivers was boiling as it fell into the sea—in fact, it was reproducing on a small scale the phenomena of boiling mud which are described above in the cases of the Wallibu and Rabaka Rivers in St. Vincent, though how far up the mountain these Wallibu effects extend, and where they give place to true volcanic discharges, it is difficult to describe as yet; we must await further observations by M. Lacroix and his colleagues.

THE WEISSHORN PASS.

By GODFREY W. H. ELLIS.

SOME few years ago, whilst reading, in A. W. Moore's well-known classic 'The Alps in 1864,' his interesting account of the first crossing of the Biesjoch, I was struck by his suggestion of the possibility of traversing the N. ridge of the Weisshorn, and so making a new pass to Zinal.

On referring to Conway and Coolidge's guide to the Central Pennine Alps I was surprised to find that there was no recorded ascent of the Weisshorn Pass, though it was reported therein to have been crossed many years ago by hunters.

In the year 1899 my guides, Alois Biner and Peter Perren, met me at Zinal, and we commenced the season by crossing the Moming Pass to Zermatt, having a hazy idea of returning the next morning by the Trift Pass. However the next day was wet, and whilst idling in Zermatt my mind reverted to the Weisshorn and to Moore's suggestion of the possibility of a route across the N. ridge of that mountain to Zinal. The possibility appeared to me to be such an attractive one that I went off to hunt up my guides to find out what they knew on the subject.

Biner knew nothing of it; he had not even been over the Biesjoch and rather scoffed at the idea. Peter, however, had often been on the Freiwänge rocks, above Randa, when hunting chamois in the winter, and thought that there would be no difficulty in the expedition.

The next day we took the 11 o'clock train to Randa, ordered our provisions at the Weisshorn Hotel, and looked about the village for a porter to carry blankets and impedimenta to an unknown *gite* below the Freiwänge rocks. No porter was to be found, but luckily we came on Alois Truffer, who, being out of an engagement, was easily persuaded to join us and return the following morning with the blankets.