

REFERENCES.

- (1) The war with the Dutch in 1759, including the battle of Biderra fought on 25th November 1759.
- (2) Misri Khan.
- (3) The spellings Khan and Caun are as the original.
- (4) Muhammed Taki Khan.
- (5) Kharakpur or Khargpur, in Monghir district.
- (6) Words in brackets struck out in original.
- (7) Date left blank in original.
- (8) Sir Robert Barker.
- (9) This name is hard to read, it looks like Laurel, but I know of no man of prominence in Bengal of that name.

NOTE ON AMBULANCE TRANSPORT IN VERY DIFFICULT MOUNTAINOUS COUNTRY.

BY R. KENNEDY,
CAPTAIN, I.M.S.

This note is founded on six and a half months' experience as Medical Officer with the Dehong Survey and Exploration Party in the Mishmi Hills on the North-East Frontier of India during the cold weather of 1912-13.

Nature of Expedition, etc.—Complete exploration and survey of the catchment area of the Dehong River was, practically speaking, the object of our little party, which comprised, in all, 9 British officers, including myself, 300 N. C. O.'s and men of the Naga Hills and Lushai Hills Military Police Battalions, 5 Sub-Assistant Surgeons, and some 1,200 Naga and Paharia coolies.

We relied solely on the coolies mentioned above for transport of all kinds.

Nature of Country traversed.—We had in all some 400—500 miles of lines of communication to look after during the survey operations, which were very extensive. Roads, in the ordinary sense of the term, did not exist; their place was taken by Mishmi paths, which are nothing more than glorified game tracks. A glance at photo. No. 1 will, perhaps, give some idea of the nature of the country which is composed of tumbled masses of jungle clad mountain peaks, spurs and ridges, many of them so steep that one wonders they don't collapse. Indeed many of the hillsides are only held together by the inter-twining roots of the jungle which is very dense. Between the ridges are valleys with sides rising practically sheer for 1,500—3,000 ft. Torrents of various size tumble through the gorges on their way to join the Dehong.

The Mishmis have long ago learnt that it is impracticable to run a path round a spur in such a country; not only on account of the difficulty of gaining a footing on the precipitous slope, but also because of the danger of land-slides. Consequently, all the paths run straight across the ridges and gorges—the slope frequently being alarmingly steep. An average day's march was anything from 5—10 miles, and entailed an ascent and descent of 3,000—4,000 ft. The rivers are crossed by:—
(1) rough bridges made by throwing a few saplings or bamboos across, in the case of small streams;

(2) suspension bridges cleverly constructed of cane; and (3) rough trestle bridges, which sometimes span the rivers in their upper reaches, where the valleys tend to open out somewhat, but even there such bridges are only possible in the middle of the cold weather. Photos. Nos. II and III are of one of the suspension bridges mentioned above. These bridges really form one of the most striking features of the Mishmi country. They are made entirely of cane cut in the neighbouring jungle; are extremely narrow, the footway only accommodating one foot at a time; and are sometimes as long as 120 yards. They are wonderfully free from "sag" and really sway very little. I have often seen five or six loaded coolies on such a bridge at one time.

Forms of Ambulance Transport used.—The difficulties of ambulance transport in a country such as I have endeavoured to shortly describe above were, needless to say, considerable. The ordinary "dandi" even had we had bearers to carry it, would have been useless, as its depth precludes its use on a really steep slope, and its width would cause it to jam in the suspension bridges; furthermore, it is of considerable weight where every pound counts. The Field Service stretcher is not suitable for carrying patients long distances, more especially in hilly country; and it requires at least 4 men to carry a patient on it. We had no ambulance transport establishment, but utilised the coolies of the daily meeting convoys, to carry sick down the line when necessary. These meeting convoys carried rations, etc., up the line between posts and, of course, when proceeding down the line, ordinarily went empty.

The sick were carried in any one of the three following methods, according to circumstances:—

(1) *Gurkha method* used by Paharia coolies for carrying sick, who were able to sit up. Photo. No. IV shows this method and explains itself. The patient sits on his blanket in the ordinary carrying sling with a brow band used by all Paharia coolies. Supported by the sling, he sits, as it were pick-a-back, on the carrier's back. Using this method two Paharia coolies can carry a patient of average weight a day's march.

(2) *The Naga method* used by the Naga coolies for carrying sick, who were able to sit up.

Photo. No. V illustrates this method. In a surprisingly short space of time the Naga coolies prepare the basket chair, which they call "tappa" from fresh cane. Each chair has a swinging foot piece as shewn in photo. The patient sits in the chair and the carrying Naga adjusts his sling and carries the whole contrivance as though it were an ordinary load. The Naga carrying sling differs from the Paharia sling in having a wooden

yoke, which fits over the shoulders, as well as the brow band; and it is so adjusted that the coolie can, by throwing his head forward or backwards, take the major portion of the weight alternately on his brow band or shoulder yoke. In this way he manages to, in some measure, rest his muscles without stopping. Using this method two Naga coolies can carry a patient of average weight a day's march.

(3) *An improvised special "dandi."*—The above two methods are simple and most effective in hilly country, when it is not essential that the patient should be recumbent and when Paharia or Naga coolies are available as they probably always will be in Expeditions on the North-East Frontier of India. When, however, it is necessary that the patient must be carried in a recumbent position, some form of "dandi" or hammock must be used. In the majority of such cases, the Ashanti hammock leaves nothing to be desired, but it is obviously unsuitable for cases where it is essential that the main axis of the body and the lower extremities shall be kept in the same plane, *e.g.*, fractured femur, etc. It was for a case of fractured femur that I first devised the "dandi" described below. We subsequently gave it a thorough trial and found it most satisfactory for such cases. It is something between the ordinary "dandi" and the Ashanti hammock, and is illustrated in photo. No. VI.

It consists of:—

- (a) A stout bamboo pole.
- (b) A rigid, flat, "mattress," of inter-woven split bamboo, measuring 6ft. by 2ft.
- (c) A sling which can be made by opening out three "gunny" bags and stitching them together by their long sides as shown in the photo. Along either side of this sling 10-12 strong eyelet holes should be worked—there are only 6 in the "dandi" in the photo., but in practice this was found to be insufficient.
- (d) A piece of thin, but strong rope, some 20" long.

Now, to "load" the "dandi," the sling is spread on the ground near the patient's bed, and the bamboo "mattress" is laid in the middle. The patient is gently lowered on to the "mattress," which has been covered with a doubled blanket, and is arranged as comfortable as possible. The pole is next held in position parallel to and close above the patient's body, while the sling is gathered up on either side and the rope is laced over the pole and through the eyelet holes in the edge of the sling. If the road to be traversed is very steep, the sling should be laced up in such a manner that the patient's body is very close to the pole; by adopting this precaution one can save the patient many a jar. Several tight turns of the rope should be taken round the pole at

either end to prevent the sling from sliding on the pole when on a steep slope. The whole can now be lifted and carried as shown in the illustration.

In the photograph, the sling is not hitched up close enough to the pole, and the rope has been made fast to the pole at one end only; further, since there were not enough eyelets in the edges of the sling, it was necessary to give the rope some turns under the sling in order to provide some extra support. Yet, the photograph which was taken before the "dandi" had been put to a practical test, shows the idea clearly enough.

The advantages of this form of "dandi" are:—

- (a) Lightness.
- (b) Even when being carried on extremely steep paths, the patient is not bumped and jarred, owing to his height from the ground.
- (c) It can be carried across a very narrow suspension bridge.
- (d) It can be readily improvised.

On the flat, four bearers could easily carry a patient a day's march in this form of "dandi;" yet in the Mishmi hills it gave eight men all they could do. On steep slopes a couple of men always went in front and, facing backwards with extended arms took the weight off the foremost bearer. In this way I saw patients lowered over what were nothing more or less than small cliffs. When a suspension bridge had to be crossed, the pole of the "dandi" was lightly bound by ropes to the chests of two bearers carrying it, so that, if they lost their balance and gripped the bridge with both hands, the pole would not slip off their shoulders. In addition to this precaution, one man crossed the bridge immediately in advance of the foremost bearer, and another man followed immediately behind the rearmost bearer; these men were ready to catch and support the pole at once, if the bearers lost their balance. In this way several long suspension bridges were negotiated without incident.

Conclusion.—I do not suggest that this form of "dandi" should be stocked for service in the hills, because the Ashanti hammock is simpler and is eminently suitable for the majority of cases. For certain cases, however, the hammock is contra-indicated, *e.g.*, cases of fractured femur; septic knee-joint, etc., and it is for these cases that this form of "dandi" is so suitable in really bad country.

When required, it can readily be improvised. The bamboo pole can be obtained in the jungle, or the ordinary "dandi" or hammock pole can be used; the "mattress" can be made from ordinary pieces of wood from packing cases, etc., if green bamboo be not available; and the Commissariat will always oblige with a few empty "gunny" bags and a suitable piece of rope.

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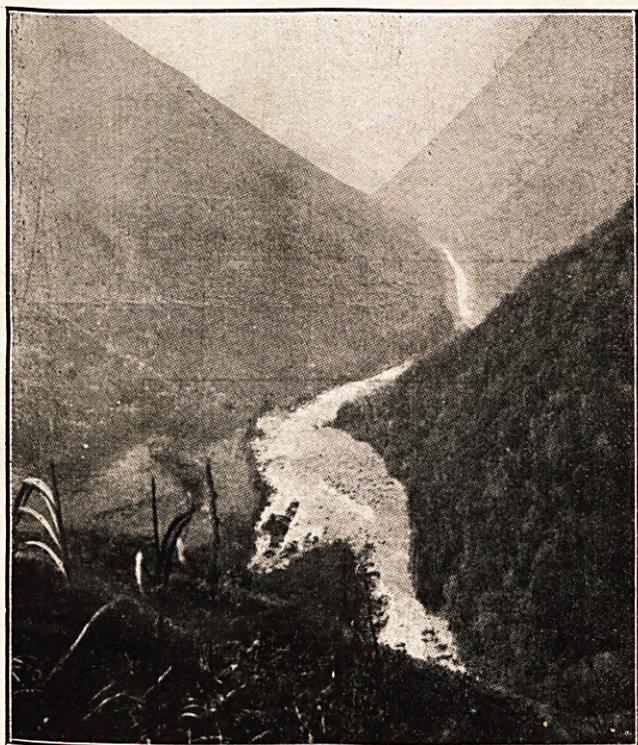


PHOTO. No. I.

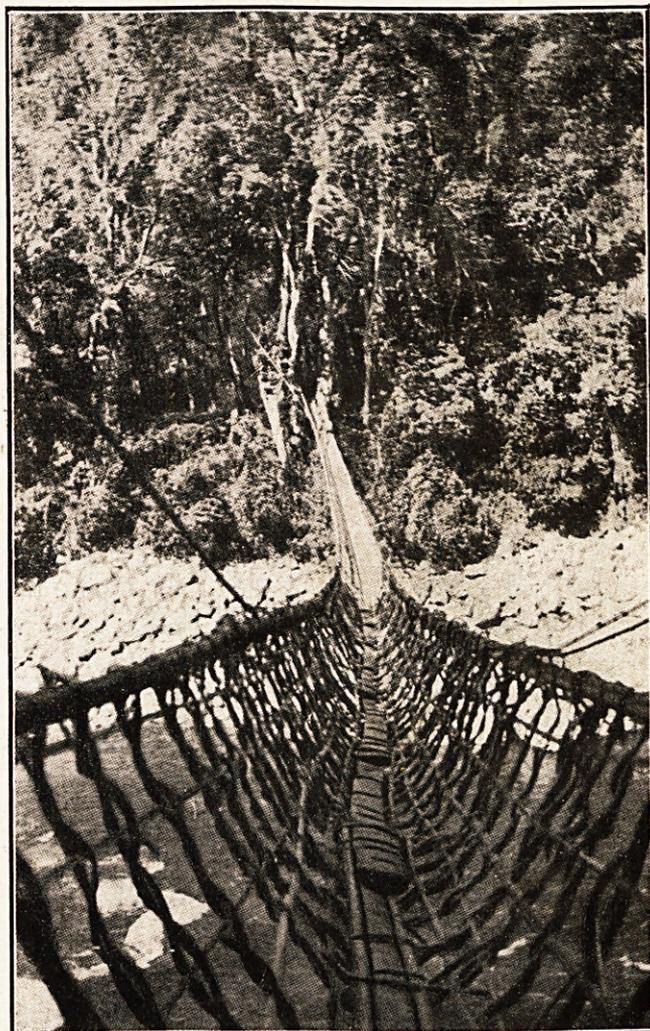


PHOTO. No. II.

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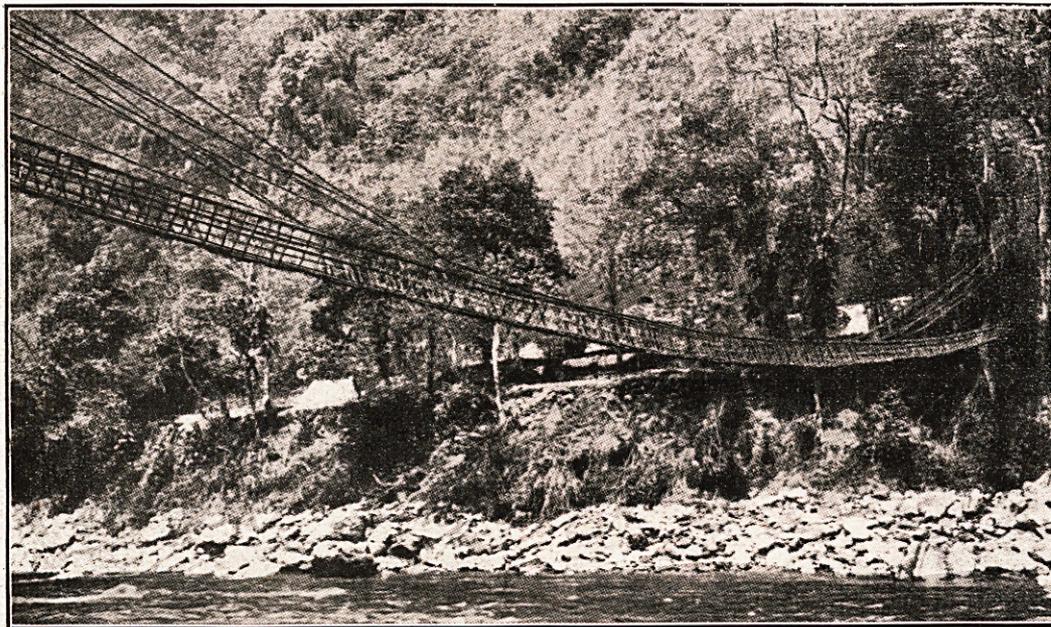


PHOTO. No. III.

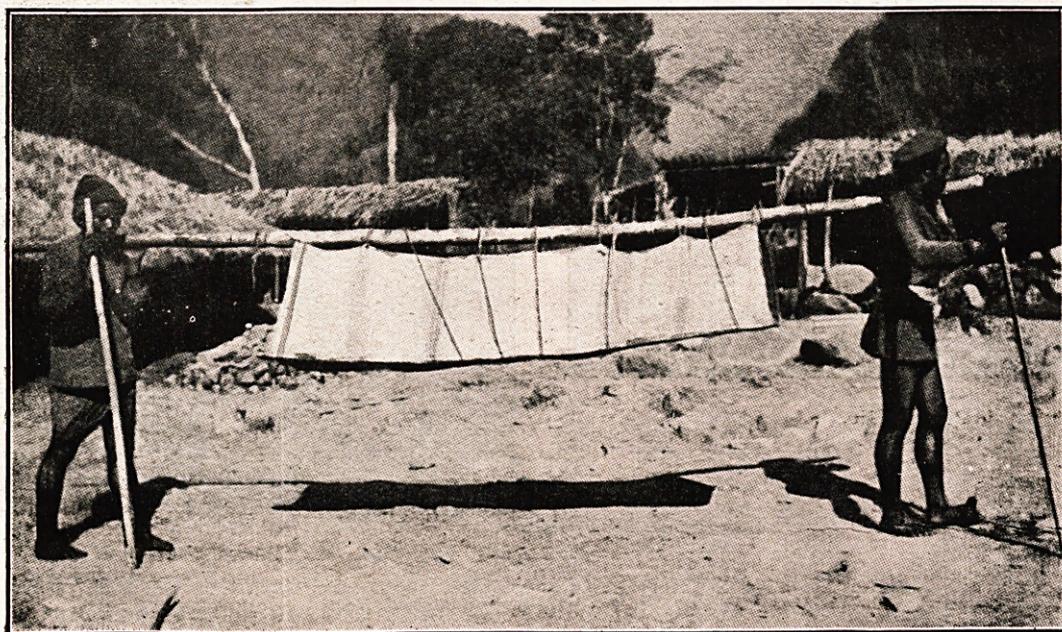


PHOTO. No. VI.

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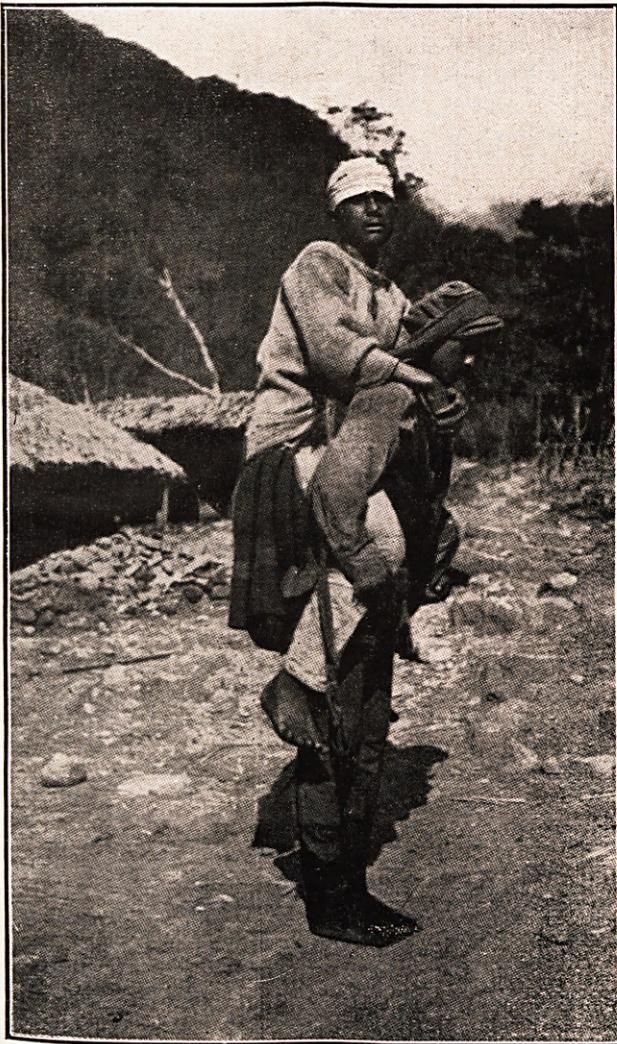


PHOTO. No. IV.



PHOTO. No. V.