throughout, except at the upper end, where it was rather faint. It continued in the same position, and of the same brightness for between 2 and 3 minutes as well as I could judge, and then gradually became fainter and fainter, till it lost its brilliancy altogether: and as it began to fade, it began also to become crooked, and to move towards the west. It became gradually more crooked, and continued to fade till it became like a thin smoke, and at last vanished away at about 3° or 4° from the place where I first saw it. I listened attentively, but heard no noise. From the time I first saw it till its brilliancy ceased, was probably about 5 minutes, and in about 3 minutes more it ceased to be any longer remarkable.

I was then at Charka, in lat. 24° 06′ and long. 81° 20′.

Dewra, 11th April, 1842.

Analysis of Iron Ores from Tavoy and Mergui, and of Limestone from Mergui. By Dr. A. URE, *London. Communicated for the Museum Economic Geology of India, by* E. A. BLUNDELL, *Esq. Commissioner, Tenasserim Provinces.*

On the right bank of the Tavoy river, opposite the town of Tavoy, runs a range of low hills at a distance from the river varying from one and a half to three miles, formed apparently of magnetic iron ore. The range extends a distance of five or six miles. At about its Northern extremity, on the summit of a hill about 150 feet in height, is found the large projecting rock mentioned in page 28 of Dr. Helfer's Second Report. This rock is about one and a half mile distant in a direct line to the bank of the river, to a spot itself distant about three miles North of the town of Tavoy. This large rock is highly magnetic on its Northern side. (According to the expression of the natives, it is alive on its Northern and dead on its Southern side). The hill appears entirely formed of this ore, and at the bottom of it are to be found the rolled masses of from two to twenty lbs mentioned by Dr. Helfer. Between the hill and the river are rice fields, through which runs a small nullah, and having between the hill and the fields about quarter of a mile of high ground well adapted for buildings, and on which high ground are found the rolled masses or boulders above alluded to.

The nullah can convey boats of three to four tons, half way through the rice fields. The same description answers for the whole extent of the range of low iron hills, having here and there small nullahs, communicating with the river. This ore was once worked by the Burmese during the time of an expedition against Siam, for iron to make swords, knives, spears, and other weapons. People were sent from Ava to smelt it, but the process appears unknown to the Tavoyers. There are still to be seen the pits in which it was smelted, with the scoriæ around the edges. The quantity of the ore appears inexhaustible.

Limestone is procurable in the province, and no doubt many localities of it will be discovered. The only one yet properly ascertained exists about fifteen miles to the Eastward of Tavoy, accessible by water to within a distance of two miles by small boats of half ton burthen. Between the locality and the stream, the land is level and high, affording facility for a road. The quantity is abundant.

Charcoal may be made with ease, owing to the abundance of excellent wood in the country adapted to it.

No. 1.—Pieces of ore knocked off the large rock mentioned by Dr. Helfer, in page 28 of his Report.

No. 2.—Pieces of ore dug up in the neighbourhood of the above large rock.

No. 3.—Rolled masses of iron ore picked up on the high ground, between the hill and the rice field.

Mergui.—About 10 miles S. W. of the town of Mergui, is an island, comprising a hill about 200 feet in height, formed apparently of iron ore. The island is perfectly accessible to boats of every description, and you land on large masses of rock, which prove to be the iron ore from which the soil has been washed away. The hill rising abruptly from the water, may be about a mile in circumference, and is wholly formed of the ore, having a rich bed of soil. A similar island, equally accessible, is formed about four miles to the Southward of the one above mentioned. It is not known that this ore has ever been worked, and the process seems unknown to the people of Mergui.

Limestone is found in several accessible localities on the main branch of the Tenasserim river, not far above the old town of that name. Specimens accompany the iron ore.

No. 1.—Boulders of iron ore picked up at the landing place of the island above mentioned.

No. 2.—Pieces knocked off large masses at landing place.

No. 3.—Pieces dug up on the hill.

No. 4.—Specimens of limestone.

London, 13, *Charlotte Street, Bedford, Square,* 26*th Nov.* 1842.

I have now the pleasure of handing you the details of my examination and analysis of the several ores of iron and the limestones from Tavoy and Mergui, with which I have been almost constantly occupied during the last fortnight.

1st. Compact magnetic iron ore.—Tavoy, No. 1.

Colour iron black with a metallic glimmer, fracture fine grained, possesses magnetic polarity, specific gravity 3.511, compared to water = 1,000.

It yields in analysis the following constituents:

Peroxide of iron	86·5	equivalent to 60·55 metal.
Silica with a trace of phosphate of lime, ...	3·5	
Water, ... — ...	10·0	
	100.0	

It contains no manganese or titanium.

2d. Compact magnetic iron ore.—Tavoy, No. 4.

External and Magnetic characters as above.

Specific gravity, 3·462.

It yields in analysis:

Peroxide of iron	86·0	equal to 60·2 metal.
Silica with a trace of phosphate of lime, ...	0·9	
Water, ...	13·1	
	100·0	

It contains neither manganese nor titanium.

3d. Tavoy ore, No. 2.—External characters as above.

Specific gravity, ... 4·369.

4th. Tavoy ore, No. 3.—Characters as above, as to aspect and magnetism.

Specific gravity, 4·100.

The two latter samples are even richer than the former, as is evinced by the specific gravity, but they are all quite rich enough and pure enough for making the best quality of bar-iron and steel.

I instituted two elaborate sets of experiments in search of titanium, which when present in any notable quantity in iron ores, renders the iron made from them red-short, but I found none in the above ores. In the first set of experiments I treated the ore as follows: I added to its solution in nitro-muriatic acid, so much tartaric acid as to render all the oxides unprecipitable by ammonia. I next added ammonia in excess, and afterwards hydro-sulphuret of ammonia, which throws down all the metals except titanium. The whole being thrown upon a filter, afforded a colourless liquid which evaporated to dryness, and carefully ignited in a platinum cup, left no trace of titanic acid, which it would have done, had any of that metal existed in the ore.

The second set of experiments for titanium consisted in transmitting sulphuretted hydrogen in excess through the nitro-muriatic solution of the ore, in then adding ammonia in excess, the effect of which is to precipitate both the iron and titanium. But the precipitate when digested with sulphurous acid, has its iron dissolved, while the titanic acid will remain undissolved as a white powder. By this means also no distinct evidence of titanium could be obtained.

5th.—The limestone from Tavoy has a specific gravity of 2·7, and is a perfectly pure, semi-crystalline carbonate of lime, akin to statuary marble. It is well adapted to act as a flux in the smelting of iron.

The three samples of iron ores from Mergui, are brown hematites, and from their density, will afford good iron in the smelting furnace.

6—Mergui iron stone No. 1 specific gravity 3.37.

7	Ditto.	Ditto.	2	Ditto.	3.18.
8	Ditto.	Ditto.	3	Ditto.	3.32.

The limestone of Mergui has a specific gravity of 2.7; it is a pure calcareous carbonate. I analyzed both the limestones.

I am, dear Sir,

Yours truly,

(Signed) ANDREW URE.
