Revenue (Land). Despatches.

PRESS SERIES.

G.O., Nos 1223-1234-1238
to

Dated 1st March 1898

[Despatch Abstract.]

Recording letter from the Secretary
Geological Survey of India forwarding
copy of the report regarding the selection
of a site for the construction of a dome of
observation for despatch to
Madras ~~and~~ Bombay for despatch to
England

Revenue (1898) Department.

CURRENT No. 1553

Read G.O.s 1146/98 & 1533/98.

P.S. Order No. 123 dated 7th March 1898 Recorded.

From
The Director,
Geological Survey of India
Calcutta.

No. 123.

Dated 17 Febry
Received 23
Registered 23
Enclosures 2
Spare copies.

To the Board (L.R.)
" " (R.P.)
C.A Middlemiss Esq.

Encl No. 1230

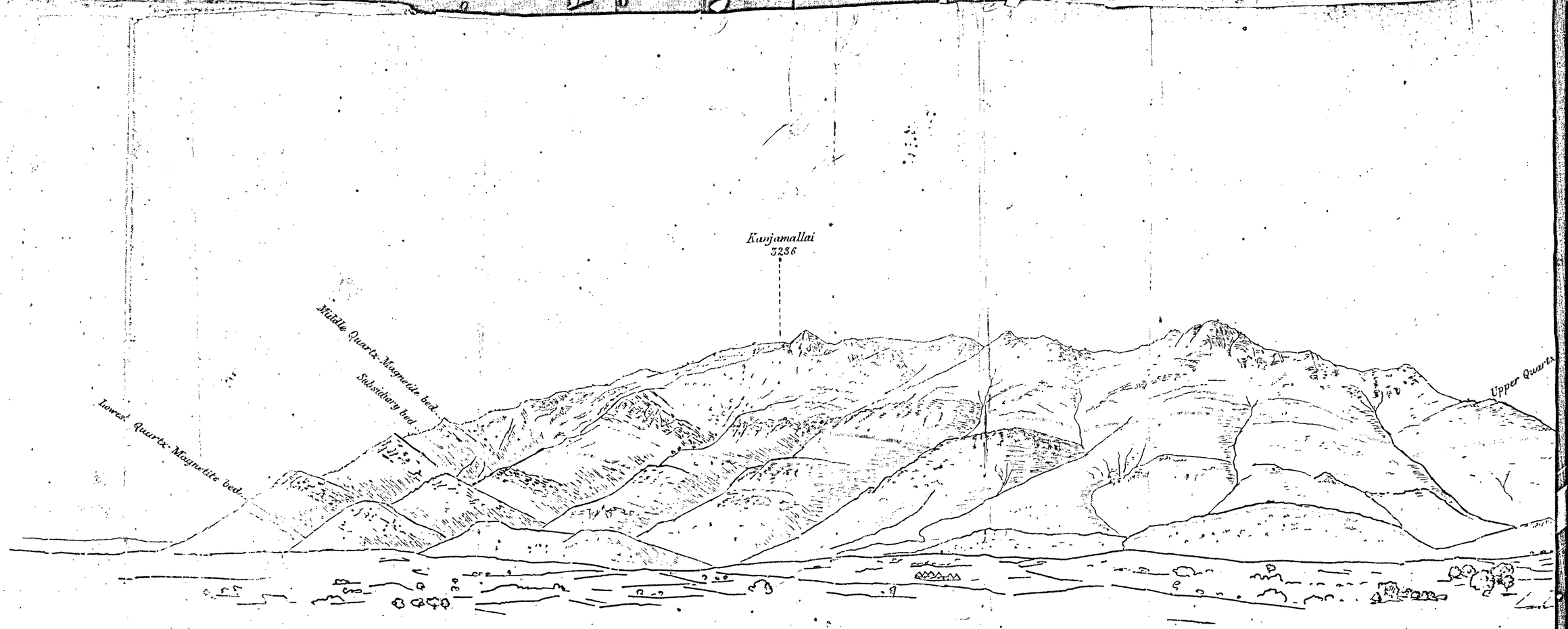
Copy to the Govt of India
Revenue & Agrl Dept

Encl No. 1233

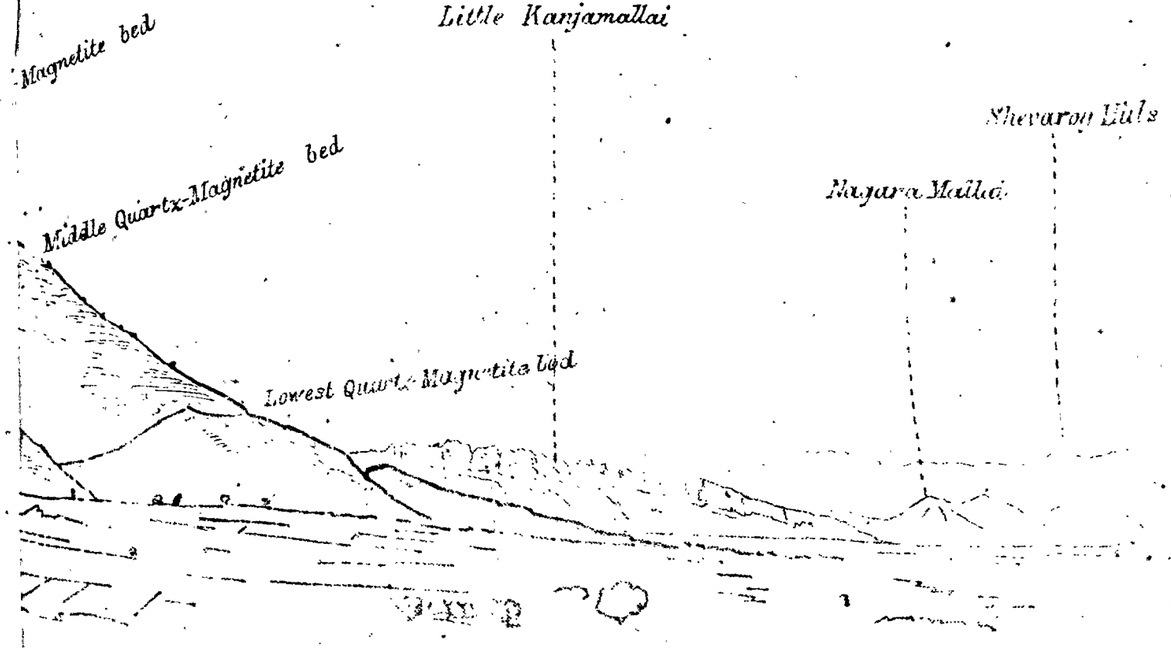
Copy to the Govt of India
Public Works Dept.

SUBJECT.

Forwarding for information of Govt a copy of Mr Middlemiss' report re: the places selected by him in the Kanjamallai in Salem Dist for extracting 2 tons of magnetic iron ore for despatch to England for experimental purposes and a trace in connection with the report



View of Kanjamallai from the S. E. showing the bands of Quartz—Magnetite rock.


Magnetite bed
Middle Quartz-Magnetite bed
Lowest Quartz-Magnetite bed
Little Kanjamallai
Shevaroy Hills
Majara Maidai

Brief Report on the Kanjamallai Quartz-Magnetite beds.

(with reference to the selection of 2 tons of the same for despatch to England for experimental purposes).

Kanjamallai is an isolated hill 3236 ft. high, about 5 miles long and 2 broad at its base.

In structure it is a qua-quaversal synclinal fold, the long axis of which corresponds to the length of the ridge (E-W). The hill is composed of a great series of regularly bedded gneisses, among which those containing hornblende, hypersthene and garnets are conspicuous. The summit-rock is crowded with large masses or nests of garnets

The bands of magnetic iron-ore are not pure magnetite, but the rock is a gneiss or schist containing a very large percentage of quartz. Some portions are fine-grained and some are coarse-grained. Whether fine or coarse the general richness of the ore in the typical parts of the bands seems to be about the same.

These bands of quartz-magnetite rock appear to be regularly bedded with the other gneisses - in the sense that the foliation and bands of the one generally coincides in direction with those of the other.

Thus (with some interruption at the N. W. end of the hill) they form concentric ellipses girdling the hill at different heights.

Generally three such bands may be recognised at different levels. These three are as follows:-.

(1) <u>The top band</u>. A somewhat insignificant one forming a small ellipse of outcrop round the higher parts of the mountain. It is not known certainly on the western slopes of the higher ridges, which are much jungle covered.

(2) <u>A middle band</u>. This generally keeps to a position some 500 ft. or so above the mountain foot. This band, composed of the coarser quartz-magnetite rock, is about 30 ft thick

(3) <u>A lowest band</u>. This forms a well-marked wall, or dyke-like chain of spurs visible almost all round the mount-

except where it here and there descends beneath the alluvium and debris fans. This band on the whole is slightly richer than No 2. It is also much thicker, about 70 ft. Its lower part is fine grained.

The general disposition of the quartz-magnetite beds on the south side of the mountain-mass may be seen from the accompanying camera sketch, in which the former are marked in red.

In endeavouring to get an idea of the average richness of the better part of the quartz-magnetite bands (for it should be remarked that at the edges the bands get gradually poorer in iron) 32 specimens were obtained at intervals from different portions of the mountain, being each carefully broken out from the unweathered central portion of a fresh lump, and their specific gravities taken. Most of these were from the lowest band, but others from the middle band were taken in the course of two traverses across the summit ridge. I confidently believe that the average richness indicated by the mean specific gravity of these 32 specimens will give an absolutely reliable guide as to the average percentage of iron that would result from working the iron ores on any large scale.

The specimens, numbered in order with their specific gravities, follow:-

(1) discarded as being weathered.

(2)	S.G.	3.35	(13)	S.G.	3.49
(3)	"	3.56	(14)	"	3.39
(4)	"	3.40	(15)	"	3.74
(5)	"	3.47	(16)	"	3.59
(6)	"	3.43	(17)	"	3.48
(7)	"	3.80	(18)	"	3.55
(8)	"	3.52	(19)	"	3.42
(9)	"	3.37	(20)	"	3.43
(10)	"	3.47	(21)	"	3.30
(11)	"	3.55	(22)	"	3.57
(12)	"	3.57	(23)	"	3.53.

(24)	S.G.	3.40	(29)	S.G.	3.58
(25)	"	3.68	(30)	"	3.54
(26)	"	3.54	(31)	"	3.63
(27)	"	3.50	(32)	"	3.51.
(28)	"	3.60			

The average S.G. of these 31 specimens is

3.51

the lowest being 3.30
the highest being 3.80

These results agree very closely with those obtained by me in 94-95 and briefly referred to in my report on the Magnesite areas of the chalk Hills. From them it may be safely asserted that it is extremely unlikely that a higher yield of iron than 40% will ever be obtained on a large scale from the Kanjamallai fields: whilst it is equally unlikely that the yield will ever sink to as low as 30%

These percentages, it must be remembered, refer to the whole rock as it would be quarried in the mass. The rock might no doubt be crushed & picked over, or other means might be adopted of separating the heavier minerals from the quartz — when of course the cleaned ore would give a much higher percentage of iron.

Only occasionally in small pockets, or as veins, or local accretions (not more than a few inches across) do we sometimes find masses of pure, or almost pure, magnetite. But it would not be fair to include these in any estimate of the general richness of the beds. It is doubtless due to some such specimens as these having been gathered that some of the analyses of the Kanjamallai are carried out at the Imperial Institute gave such abnormally rich percentages of iron (about 7%).

In selecting a place for the extracting of the 2 tons for despatch to England I have gone by the results of the specific gravities as tabulated above; although I do not think the rock <u>as a whole</u> in this particular locality is likely to be richer than any of the other portions of the same band.

The position has the advantages also of being immediately opposite the Arcjanur railway station and is near the foot of the mountain.

Sd/ C. S. Middlemiss
Superintendent Geol. Survey of India
6/2/08

(True copy.)

C. S. Middlemiss

Registrar, Geological Survey of India.

No. 123.

FROM

C. L. GRIESBACH, ESQ., C.I.E., F.G.S.,
DIRECTOR, GEOLOGICAL SURVEY OF INDIA,

TO

The Secretary to Government
Revenue Department,
Madras.

Dated Calcutta, February 17 1898.

SIR,

With reference to correspondence ending with my telegram of the 18th January 1898, I have the honour to state that Mr. Middlemiss reported his arrival at Salem on the 24th January, and that on the 2nd February he selected and marked in the presence of the Public Works Department subordinate detailed to do the necessary blasting and quarrying a sufficient quantity of the Kanjamallai magnetic iron ore, to yield the two tons required for shipment to England.

2. A copy of Mr. Middlemiss' report, and of the tracing accompanying it, showing how the selection was made is enclosed for information.

I have the honour to be,
Sir,
Your most obedient Servant,

C. L. Griesbach.
Director, Geological Survey of India.

Enclos.
1 copy 1 report.
1 tracing.

0
18 4,000—19-7-97.

Revenue (1898) Department.

CURRENT No. 1146.

610

Revd 15/2/98

From Mr. C. S. Middlemiss
Superintendent Geological
Survey of India
Adamalpet
No. Coimbatore Dist.

Dated 6th Feby
Received 9th
Registered 10th
Enclosures /
Spare copies.

Mdt: P.S
Order No. 928-16th Feby 1898.
Recorded.

15/2/98

Copy to the Board (L.R.)
" (R.J.).

60/3

Mr
14/2/98.

SUBJECT.

Enclosing a copy of report made to the Director of Geological Survey of India in connection with the selection of a site for the extraction of 2 tons of magnetic iron ore for despatch to England.

130

From

C.S. Middlemiss

Supdt. Geological Survey of India

To

The Secretary to the Government of Madras

Revenue Department

Madras

Camp via

Udamalpet

(Coimbatore dist.)

6. Feb. 1898.

Sir

Having concluded my examination of the Kanjamalais hill with reference to the selecting a site for the extraction of 2 tons of magnetic iron ore for despatch to England, I herewith have the honour to enclose a copy of a report on the same made to my Director in that connection.

I have the honour to be

Sir

Your most obedient servant

C.S. Middlemiss

Copy of Report on the Kanjamallai Quartz-Magnetite beds

(with reference to the selection of 2 tons of the same for despatch to England for experimental purposes).

Kanjamallai is an isolated hill 3236 ft. high, about 5 miles long and 2 broad at the base. In structure it is a qua-quaversal synclinal fold, the long axis of which corresponds to the length of the ridge (E.—W.). The hill is composed of a great series of regularly bedded gneisses, among which those containing hornblende, hypersthene and garnets are conspicuous. The summit rock is crowded with large masses or nests of garnets.

The bands of magnetic iron-ore are not pure magnetite, but the rock is a gneiss or schist containing a very large percentage of quartz. Some portions are fine-grained and some are coarse-grained. Whether fine or coarse the general richness of the ore in the typical parts of the bands seems to be about the same.

These bands of quartz-magnetite rock appear to be regularly bedded with the other gneisses — in the sense that the foliation and bands of the one generally coincide in direction with those of the other. Thus (with some interruption at the N.W. end of the hill) they form concentric ellipses girdling the hill at different heights.

Generally three such bands may be recognized at different levels.

These three are as follows:—

(1) The top band. A somewhat insignificant one forming a small ellipse of outcrop round the highest parts

of the mountain. It is not known certainly on the western slopes of the highest ridges, which are much jungle covered.

(2) A middle band. This generally keeps to a position some 500 ft. or so above the mountain-foot. This band, composed of the coarser quartz-magnetite rock, is about 30 ft. thick.

(3) A lowermost band. This forms a well-marked wall, or dyke-like chain of spurs visible almost all round the mountain, except where it here & there descends beneath the alluvium and debris fans. This band, on the whole, is slightly richer than No 2. It is also much thicker, about 70 ft. Its lower part is fine-grained.

The general disposition of the quartz-magnetite beds on the S. side of the mountain-mass may be seen by the accompanying camera sketch in which the former are marked in red [Sent to the Director with original report]

In endeavouring to get an idea of the average richness of the better part of the quartz-magnetite bands (for it should be remarked that at the edges the bands get gradually poorer in iron) 32 specimens were obtained at intervals from different parts of the mountain, being each carefully broken out from the unweathered central portion of a fresh lump, and their specific gravities taken. Most of these were from the lowest band, but others from the middle band were taken in the course of two traverses across the summit ridge. I confidently believe that the average richness indicated by the mean specific gravity of these

32 specimens will give an absolutely reliable guide as to the average percentage of iron that would result from working the iron ores on any large scale.

The specimens, numbered in order with their specific gravities, follow :-

(1)	discarded as being weathered		(18)	S.G.	3.55
(2)	S.G.	3.35	(19)	"	3.42
(3)	"	3.56	(20)	"	3.43
(4)	"	3.40	(21)	"	3.30
(5)	"	3.47	(22)	"	3.57
(6)	"	3.43	(23)	"	3.53
(7)	"	3.80	(24)	"	3.40
(8)	"	3.52	(25)	"	3.68
(9)	"	3.37	(26)	"	3.54
(10)	"	3.47	(27)	"	3.50
(11)	"	3.55	(28)	"	3.60
(12)	"	3.57	(29)	"	3.58
(13)	"	3.49	(30)	"	3.54
(14)	"	3.39	(31)	"	3.63
(15)	"	3.74	(32)	"	3.51.
(16)	"	3.59			
(17)	"	3.48			

The average specific gravity of the last 31 specimens is

3.51

the lowest being 3.30

the highest being 3.80 .

These results agree very closely with those obtained by me in '94-'95, and briefly referred to in my report on the magnesite areas of the Chalk Hills. From them it may be safely asserted that it is certainly

50%

unlikely that a higher yield of iron than 40 % will ever be obtained on a large scale from the Kanjamallai fields; whilst it is equally unlikely that the yield will ever sink as low as 30 %.

These percentages, it must be remembered, refer to the whole rock as it would be quarried in the mass. The ~~same~~ rock might no doubt be crushed and picked over, or other means might be adopted of separating the ~~the~~ ferrie minerals from the quartz — when of course the cleaned ore would give a much higher percentage of iron.

Ore occasionally in small pockets or as veins or local accretions (not more than a few inches across) do we sometimes find masses of pure or almost pure, magnetite. But it would not be fair to include these in any estimate of the general richness of the beds. It is doubtless due to some such specimens as these having been gathered that some of the analyses of the Kanjamallai ore carried out at the Imperial Institute gave such abnormally rich percentages of iron (about 70 %)

In selecting a place for the extracting of the 2 tons for despatch to England I have gone by the results of the specific qravities as tabulated above; although I do not think the rock as a whole in this particular locality is likely to be richer than any of the other portions of the same band. The position has the advantage also of being immediately opposite the Attigaunur railway station, and is near the foot of the mountain.

(True Copy).

C. S. Middlemiss
6-2-98.

A,

Note for the Despatcher

Please cancel C.o.r. 92
16-2-98.
& get the copy of the C.o.
on the 2 cancelled 1146/98
& 1553/98.

J.
9/3/98

Note for the under secretary.

With C.r.o 1146 of '98
Mr Middlemiss submitted a copy of his report on the Kanjamalai magnetite beds, and it was recorded in C.o r.o 92 d 16.2.98. of which a proof copy has now been received from the Press. With C.r.o 1553 of '98 the Director Geological Survey encloses a copy of the same report and this has also to be recorded. It is submitted that as the C.o. above quoted has not yet issued, it may be cancelled and the two currents read together. A draft order disposing of both the currents is put up on the docket of C.r.o 1553/98. for approval.

Yours
13/8

Mr
20/2/98.

Government (1898) of Madras.

REVENUE.

Recd. } 1898. *Enclosures*

Regd. } *Spare copies*

G.O., Nos. 123, 123A, 123B, 1st March 1898.

MARCH.

Magnetic Iron-ore.

Recording letter from the Superintendent, Geological Survey of India, forwarding copy of the report regarding the selection of a site for the extraction of two tons of — for despatch to England.

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

Read—the following letter from C. S. MIDDLEMISS, Esq., Superintendent, Geological Survey of India, to the Secretary to the Government of Madras, Revenue Department, dated Udamalpet, 6th February 1898 :—

Having concluded my examination of the Kanjamallai Hill with reference to the selecting a site for the extraction of two tons of magnetic iron-ore for despatch to England, I herewith have the honour to enclose a copy of a report on the same made to my Director in that connection.

Enclosure.

Report on the Kanjamallai Quartz-Magnetite Beds (with reference to the selection o tons of the same for despatch to England for experimental purposes).

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The general disposition of the quartz-magnetite beds on the south side of the mountain-mass may be seen by the accompanying camera sketch, in which the former are marked in red (sent to the Director with original report).

In endeavouring to get an idea of the average richness of the better part of the quartz-magnetite bands (for it should be remarked that at the edges the bands get gradually poorer in iron), 32 specimens were obtained at intervals from different parts of the mountain, being each carefully broken out from the unweathered central portion of a fresh lump, and their specific gravities taken. Most of these were from the lowest band ; but others from the middle band were taken in the course of two traverses across the summit ridge. I confidently believe that the average richness indicated by the mean specific gravity of these 32 specimens will give an absolutely reliable guide as to the average percentage of iron that would result from working the iron-ores on any large scale.

The specimens, numbered in order with their specific gravities, follow :—

(1)	Discarded as being weathered.			(17)	Specific gravity	...	3·48
(2)	Specific gravity	...	3·35	(18)	Do.	...	3·55
(3)	Do.	...	3·56	(19)	Do.	...	3·42
(4)	Do.	...	3·40	(20)	Do.	...	3·43
(5)	Do.	...	3·47	(21)	Do.	...	3·30
(6)	Do.	...	3·43	(22)	Do.	...	3·57
(7)	Do.	...	3·80	(23)	Do.	...	3·53
(8)	Do.	...	3·52	(24)	Do.	...	3·40
(9)	Do.	...	3·37	(25)	Do.	...	3·68
(10)	Do.	...	3·47	(26)	Do.	...	3·54
(11)	Do.	...	3·55	(27)	Do.	...	3·50
(12)	Do.	...	3·57	(28)	Do.	...	3·60
(13)	Do.	...	3·49	(29)	Do.	...	3·58
(14)	Do.	...	3·39	(30)	Do.	...	3·54
(15)	Do.	...	3·74	(31)	Do.	...	3·63
(16)	Do.	...	3·59	(32)	Do.	...	3·51

The average specific gravities of the last 31 specimens is 3·51, the lowest being 3·30, the highest being 3·80.

These results agree very closely with those obtained by me in 1894–95, and briefly referred to in my report on the magnesite areas of the Chalk Hills. From them it may be safely asserted that it is extremely unlikely that a higher yield of iron than 40 per cent. will ever be obtained on a large scale from the Kanjamallai fields ; whilst it is equally unlikely that the field will ever sink as low as 30 per cent.

These percentages, it must be remembered, refer to the whole rock as it would be quarried in the mass. The rock might, no doubt, be crushed and picked over, or other means might be adopted of separating the heavier minerals from the quartz—when, of course, the cleaned ore would give a much higher percentage of iron.

Only, occasionally, in small pockets or as veins or local accretions (not more than a few inches across), do we sometimes find masses of pure or almost pure magnetite. But it would not be fair to include these in any estimate of the general richness of the beds. It is doubtless due to some such specimens as these having been gathered that some of the analyses of the Kanjamallai ore carried out at the Imperial Institute gave such abnormally rich percentages of iron (about 70 per cent.).

In selecting a place for the extracting of the two tons for despatch to England, I have gone by the results of the specific gravities as tabulated above, although I do not think the rock, *as a whole*, in this particular locality, is likely to be richer than any of the other portions of the same band. The position has the advantage, also, of being immediately opposite the Ariyanur railway station, and is near the foot of the mountain.

Read—the following letter from C. L. GRIESBACH, Esq., C.I.E., F.G.S., Director, Geological Survey of India, to the Secretary to the Government of Madras, Revenue Department, dated Calcutta, 17th February 1898, No. 123 :—

With reference to correspondence ending with my telegram of the 18th January 1898, I have the honour to state that Mr. Middlemiss reported his arrival at Salem on the 24th January and that, on the 2nd February, he selected and marked, in the presence of the Public Works Department subordinate detailed to do the necessary blasting and quarrying, a sufficient quantity of the Kanjamallai magnetic iron-ore, to yield the two tons required for shipment to England.

2. A copy of Mr. Middlemiss' report, and of the tracing accompanying it, showing how the selection was made, is enclosed for information.

Order—No. 123, Revenue, dated 1st March 1898.

Miscellaneous.

Recorded.

(True Extract.)

(Signed) G. S. FORBES,
Ag. Secretary to Government.

Copy to the Board of Revenue (Land Revenue).
" " (Revenue Settlement, Land Records and Agriculture).

Copy to C. S. Middlemiss, Esq.

Endorsement No. 123A.

Copy to the Government of India, Revenue and Agricultural Department.

(Signed) N. E. MARJORIBANKS,
Ag. Under Secretary to Government.

Endorsement No. 123B.

Copy to the Government of India, Public Works Department.

(Signed) N. E. MARJORIBANKS,
Ag. Under Secretary to Government.

Exd. T. K. Narayana Ayangar

100 Copies.