

8383

Public Works (1896) Department.

G.O., No. 2668W

urgent

DATED 19th September
1896.

[Despatch Abstract.]

Corandum deposits : P.O. Rev. Dept requesting
Mr. Middlemiss to prepare and forward a rough
estimate of the work to be undertaken & of the funds
required for a detailed investigation of the — in the
Dharmapuri taluk Salem Dist. ^{with remarks}
to S.E. W. Cich & that officer directed to arrange for an
upper subordinate being placed in charge of the quarrying
operations.

9-2/9

Proceedings, Revenue Department, requesting Mr. Middlemiss to prepare and forward a rough estimate of the work to be undertaken and of the funds required for a detailed investigation of the — in the Dharmapuri taluk, Salem district, communicated to Superintending Engineer, IV Circle; and that officer directed, with remarks, to arrange for an upper subordinate being placed in charge of the proposed quarrying operations.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following paper :—

G.O., Mis. No. 3638, Revenue, dated 11th September 1896.

Read—again the following G.O., Mis. No. 3072, dated 1st August 1896 :—

Read—the following letter from DENZIL IBBETSON, Esq., C.S., Officiating Secretary to the Government of India, Department of Revenue and Agriculture (Geology and Minerals), to the Secretary to the Government of Madras, dated Simla, the 18th April 1896, No. 982—22—3 :—

I am directed to invite attention to the correspondence on the subject of the deputation of Mr. C. S. Middlemiss of the Geological Department to the Madras Presidency and to forward a copy of paragraph 3 of a letter No. 597, dated 9th March 1896, from the Director, Geological Survey. My letter No. 3604—68—2, dated 11th December 1894, conveyed the sanction of the Government of India to the retention of Mr. Middlemiss' services up to the spring of 1896 in order to complete the investigation of the corundum deposits in the Salem district; and it was said in the same letter that the Government of India would bear in mind the need for a more practical investigation of the industrial resources of the Madras Presidency after the preliminary examination of the Salem district had made some progress.

2. The Geological Survey programme for the five years 1895—1900, a copy of which was forwarded to the Government of Madras under endorsement No. 19—72—4, dated 25th September 1895, shows that it is proposed to employ Mr. W. Anderson, the Mining Specialist, together with Sub-Assistant Hira Lal in Madras during the field seasons of 1897—98 and 1898—99. The Government of India have only engaged the services of Mr. Anderson for a term of five years, which will expire at the end of September 1899, and they are desirous of framing a working plan and estimate of the total cost of the operations on which he is to be employed during the remainder of his term. Mr. Anderson's programme of operations in Madras will no doubt be framed with special reference to the results of the preliminary investigations which are being made by Mr. Middlemiss; and I am directed to request that the Government of India may be furnished with early information showing whether Mr. Middlemiss' survey has as yet yielded any results justifying the deputation of Mr. Anderson to follow them up. If so, the Governor in Council will doubtless wish to lay down a special programme of work for that officer, and in any case, I am to request that, as soon as information is available upon which they can be based, a working plan and estimate of the cost may be prepared for the information of the Government of India.

ENCLOSURE.

COPY of paragraph 3 of a letter No. 597, dated 9th March 1896, from the Director, Geological Survey of India, to the Secretary to the Government of India, Department of Revenue and Agriculture.

3. As regards the work in the Salem and Coimbatore districts of Madras, which has been sanctioned for 1897—98 and 1898—99, it is almost impossible to frame a detailed programme now. In the first place, Mr. Middlemiss' Geological Survey of that area is not yet finished and the programme of work for Mr. Anderson will have to be framed with special reference to the results obtained by the former officer. And secondly, much will depend upon the special requirements of the Government of Madras which have not so far been ascertained in detail. The

field of inquiry in Madras is of such great proportions, that Mr. Anderson will scarcely be able to examine more than a small portion of the area which Messrs. Middlemiss and Smith are now surveying, and their final reports will have to be awaited before deciding upon Mr. Anderson's programme of work.

Mis. No. 1647, Revenue.

Forwarded to the Board of Revenue for early report.

Ootacamund,
30th April 1896.

(Signed) LIONEL DAVIDSON,
Ag. Under Secretary to Govt.

Read—the following Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 3116, dated 24th June 1896 :—

Read—again the following Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 2651, dated 2nd June 1896 :—

Read—Endorsement from Government, Revenue Department, No. 1647, dated 30th April 1896.

Resolution—Mis. No. 2651, dated 2nd June 1896.

Communicated to Mr. Middlemiss, with the request that he will submit at a very early date a report showing the results of his enquiries in this Presidency together with any suggestions for the programme to be laid down for Mr. Anderson, should the results obtained be such as to justify his deputation, and information that will enable the Board to frame the working plan called for.

2. Mr. Middlemiss is also requested to report what progress has been made in the revision of the Provisional Index of minerals—*vide* Board's Proceedings, No. 130 (Revenue Settlement, Land Records and Agriculture) of 1895.

(True Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

Read—also the following letter from C. S. MIDDLEMISS, Esq., Superintendent, Geological Survey of India, "Cottissa," Ootacamund, dated 8th June 1896 :—

In reply to the Board's Proceedings, Mis. No. 2651, dated 2nd June 1896, I have the honour to enclose a report dealing with such results as have been attained by my survey of certain minerals in the Coimbatore and Salem districts. Inasmuch as the Director of the Geological Survey of India in paragraph 3 of his letter, No. 597, dated 9th March 1896, to the Secretary to the Government of India, Revenue Department, has laid down that it is almost impossible to frame a detailed programme of work for the Mining Specialist, Mr. Anderson, until my preliminary survey has been finished, and inasmuch as the deputation of the Mining Specialist to Madras will overlap the period of my own deputation, it is evident that, if the programme of work for Mr. Anderson is indeed to be dependent on work done by me, it must be framed on such preliminary and partial results as I can now and hereafter state before Mr. Anderson's arrival. The results given in this report must be understood, therefore, to be of a temporary nature, liable to modification in detail as further progress is made with my survey.

Such suggestions for the employment of Mr. Anderson as are therein made must also be understood to be inspired by what I have personally seen of parts of two districts only. I should not consider myself qualified or authorized to propose any work outside of those districts.

2. With regard to the revision of Dr. King's Provisional Index of useful minerals, I have the honour to state that it is in progress and that I hope to issue it by the end of this month.

3. A supplementary report on some new corundum localities will also be sent in by me.

ENCLOSURE.

Brief report on some minerals in the Coimbatore and Salem districts with special reference to the future deputation of a Mining Specialist to make practical investigations.

Obviously the first question requiring a definite answer from me is whether or not my survey has as yet yielded any results justifying the deputation of Mr. Anderson to this Presidency, with the object of following up those results. This question I can only answer in the affirmative. It is my belief that (taking one subject only for consideration) a practical investigation of the corundum areas, in the direction of determining the cost of getting the mineral on a large scale, is absolutely essential unless all the preliminary work done by me is to be thrown away. I have shown in my "Preliminary report on some corundum localities in the Salem and Coimbatore districts" that the area of productive rock is very large, that it is most probably capable of great extension, that the mineral is there in great abundance, but that the scattered distribution of it in the matrix is the one factor which makes a practical trial indispensable. Assuming, then, that on this account alone the need for an investigation by a mining specialist is paramount, I will now give a list of such mineral occurrences as have been—some more, and some less—completely investigated by me, and which might need a specialist's attention. I divide them into two groups,—(1) those of more economic importance, and (2) those of less economic importance:

(1) Those of more economic importance—

- (a) Corundum areas of Salem and Coimbatore districts.
- (b) Magnetite of Kanjamalai hill, Salem district.
- (c) Quartz-reefs of Kollegal and the neighbouring taluks.

(2) Those of less economic importance—

- (d) Chromite and associated minerals of the Chalk hills.
- (e) Haematite beds of Kollegal.
- (f) Marble beds of Madukarai.
- (g) Opal near Bargúr.
- (h) Beryl near Kángyam.
- (i) Mica of Iddapaddi.
- (k) Potstone near Taramangalam.

I propose to take these mineral occurrences *seriatim*, giving a very brief resumé of such conclusions bearing on practical questions as I have been led to, and throwing out a few suggestions as to the direction a practical investigation should take.

(a) *Corundum areas of Salem and Coimbatore.*—For information under this head I refer the reader to my report quoted above, and to the supplementary report which will be shortly issued. For making a thorough practical test of the value of the mines, machinery must be employed; as to the nature of which I can give no advice other than that it must be capable of gently pulverizing the rock without grinding it to powder, after which a process of washing, or some other method depending on specific gravity, will serve to separate out the corundum.

(b) *Magnetite of Kanjamalai.*—The proximity of the rail to the magnetic iron beds of Kanjamalai makes it desirable to thoroughly determine their true value. It has long been known that a vast store of iron is present in the hill; and my own observations have tended to show that the lowest band which girdles the south, south-east and north-east sides of the hill is the only one that need be considered, inasmuch as it is the thickest and, most probably, the richest band. What is required here is a practical examination of this layer, bed by bed, all round the hill, to ascertain the percentage of iron in the richest parts. From my own observations I am inclined to think that the average richness of the ore has been considerably over-rated.

(c) *Quartz-reefs of Kollegal.*—A number of quartz-reefs in the Kollegal taluk, and the neighbouring taluks of Satyamangalam and Bhaváni, and lying among the Northern forest covered hilly tracts of the Coimbatore district have been found to show a few traces of gold. A fragment of quartz from one of these found by myself near Kavudahalli on the site of the old Tippoo mines showed good visible gold, and yielded on analysis a little over 2½ oz. to the ton. I consider that it might be worth while to test practically some of these reefs in the field. As Mr. Anderson is at present testing the gold-bearing capacity of quartz-reefs in Chota Nagpur, he possesses all the necessary plant for this work.

The corundum mines, the magnetite of Kanjamalai, and the auriferous quartz-reefs of Kollegal are, then, in my opinion, the three matters of chief importance to which the Mining Specialist's attention should first be turned. If the Madras Government decides on selecting

one or other of these for further investigation by Mr. Anderson, I shall be glad to give in a detailed report all the geological information that I have obtained on the subject. At present, I do not think that it would be worth while burdening this report with technical minutiae.

(d) *The chromite and associated minerals of the Chalk hills.*—As in the case of the corundum localities, a report on this subject has already been made by me, and published by the Government of Madras. I need only refer to that report for such geological details as would be of value for the mining specialist. I may, however, point out that, as the chromite is probably the most valuable mineral of that locality and the one about which exact information is wanting, it is therefore the one which should receive the first attention. So far as I have been able to ascertain, it is not known whether the old mines worked by the Porto Novo Company followed a regular vein of the mineral or not; whether the vein, if it existed, was worked out or not; or whether the work was stopped for some other (e.g., financial) reasons, or from water difficulties. Hence these are the questions which I would recommend for the Mining Specialist's attention if it is decided to employ him in this investigation. The work would probably entail extensive excavation in a disintegrating rock.

(e) *Haematite beds of Kollegal.*—A number of haematite beds were found during the last cold season by Mr. Smith and myself in the northern parts of Kollegal. The great distance of these from railway communication will probably be considered at present an insuperable obstacle to the working of them. But, should the mining specialist be required to investigate the auriferous quartz-reef of Kollegal and the neighbouring taluks, he might at the same time give some attention to these iron ores. As before, it is needless giving geological details here, which will be combined in a special report if it be determined by the Madras Government to pursue the matter further.

(f) *Marble of Madukarai near Coimbatore.*—For the sake of completeness I mention these marble beds here, although it is doubtful whether a mining specialist could add much to our knowledge of them. The beauty and adaptability of the stone yielded by them for ornamental purposes has been practically demonstrated by the church at Coimbatore, where it has been largely utilized. I think, if it were more generally known what handsome building material is available at this locality, a good demand for it would arise in Ootacamund and possibly in Madras. I may incidentally recommend that a series of large blocks of the white, grey and flesh-coloured varieties should be cut, polished and placed conspicuously in the Madras Museum (if this has not already been done); and that other steps should be taken to advertise the stone. At present, beautiful white marble is being used, rough-hewn and unpolished, for making drinking-troughs for animals and for building walls. The general extent and thickness of the marble beds have been already surveyed by me. Full details could be furnished after another visit, if desired.

(g) *Serpentine, opal and chalcidony near Bargúr.*—A vein of serpentine a few miles south of Bargúr in the Bhaváni taluk was found by me during last field season. Among it occurs minute strings and veins of magnesite, chalcidony and common opal. In the brief examination I was able to make of the vein, I found no signs of precious opal, but the possibility of it occurring there should not be lost sight of.

(h) *Beryl (aquamarine) near Kángyam, Coimbatore district.*—Beyond tradition and report nothing certain is known concerning the actual occurrence of this mineral. I was unable to obtain any trace of it from the locality pointed out to me, nor by offer of a reward was I able to get any one to undertake a search. Some of the natives of Kángyam possess beryls strung together with prisms of green glass, the former being believed to have come from the locality. It is an open question whether a properly conducted search with mining appliances would bring more of these gems to light (see Coimbatore District Manual, page 23).

(i) *Mica, Iddapaddi.*—In the neighbourhood of Iddapaddi near Sankaridrug in the Salem district, there occur a few superficial workings in a vein of extremely coarsely foliated granite (segregation vein?). A small amount of mica has been taken therefrom. Plates as much as one foot square can be obtained at the surface, but most of what I saw was not very clear, and was spoilt in some instances by inclusions of minute plates of garnets. On separating the plates of mica the garnets fell out leaving small holes. It is possible that deeper working might reveal better preserved mica plates; but unless they can be found free of the garnet inclusions, they would be useless for economic purposes.

(k) *Potstone, north of Taramangalam, Salem district.*—Near Chinnashoragai = Sinnasorkai of map, 4 or 5 miles north-west of Taramangalam, there is a coarsely crystalline talc rock of inferior quality which is worked locally in two mines for the making of platters and bowls for the domestic use of Brahmins. I do not think it likely that a finer, more compact, and more valuable form of the mineral (steatite) would be found at this place.

Such, then, is a brief account of the more and the less important minerals which I have personally observed in the Salem and Coimbatore districts. In endeavouring to frame a working plan and estimate of costs for the subsequent more practical investigations by Mr. Anderson, the Board of Revenue will necessarily find that much depends on the particular mineral investigation which they decide to take up first. If the corundum areas are to be practically tested

in the way I have indicated above, it will be necessary to consult with Mr. Anderson as to the methods and machinery which he will prefer to adopt, having regard to the nature and distribution of the mineral in the matrix as described in my report on the corundum areas. Until the requirements in this direction are known, an estimate of costs cannot be prepared.

With regard to the magnetite of Kanjamalai, the requirements will perhaps be simpler, because the investigation there will merely be that of a series of analyses of a sufficient number of specimens of the ore to make it possible to arrive at a fair average as to its quality.

As regards the quartz-reefs of Kollegal an estimate of the cost of testing them can, I should think, be fairly deduced from the similar operations now being conducted by Mr. Anderson in Chota Nagpur.

As regards the other minerals grouped under the heading "less important," I think it scarcely likely that any estimate can be arrived at until Mr. Anderson shall have seen the localities for himself and determined on the method of investigation in each respective case.

Resolution—Mis. No. 3116, dated 24th June 1896.

The second paper read above will be submitted for the information of Government with reference to its endorsement read in the proceedings above quoted.

2. It will be observed that Mr. Middlemiss considers that the Mining Specialist could be usefully employed in collecting more detailed and exact information than he has been able to obtain regarding the utilization of (1) corundum in the corundum area of Salem and Coimbatore, (2) the iron of Kanjamalai, and (3) certain gold-bearing quartz-reef in Kollegal, besides certain other minerals found in the area so far examined by Mr. Middlemiss.

3. A perusal of the report shows, the Board considers, that the deputation of Mr. Anderson to follow up the results already obtained is desirable, and it would suggest that that officer should, in the first place, devote his attention to solving the points mentioned by Mr. Middlemiss regarding corundum and chromite. In the case of the Kanjamalai iron, the investigation is already proceeding in a practical direction, and as to the gold-bearing quartz of Kollegal, it would appear to be sufficient to leave that to private enterprise. The facts collected as to the last area will, it is presumed, be published in Mr. Middlemiss' next report.

4. As to the preparation of a detailed programme of work and estimate of cost, the Board thinks that these can only be prepared by a mining specialist after he has made himself acquainted with the information already on record, and the circumstances of the locality. It would therefore suggest that Mr. Anderson should, at a very early date, pay a visit to the district and prepare the required programme and estimate in consultation with Mr. Middlemiss. The Board thinks that it would be well if Mr. Anderson could also arrange to inspect and report on the mica-mining industry in Nellore. The industry is one of daily increasing importance, as the demands for mica for electrical purposes are great and growing, and Mr. Anderson might be able to give suggestions both as to the conduct of mining operations and also as to places in which they might be conducted with advantage. Suggestions from him would be valuable, which would tend to the more economical working of mica mines, having especial regard to reducing the waste in the process of extraction and trimming. Any process by which mica waste could be rendered useful for electrical or other purposes should be brought to notice.

5. As to Mr. Middlemiss' suggestion regarding the placing of specimens of Madukarai marble in the Madras Museum, the Board would suggest that the Superintendent thereof should be instructed to give effect thereto at a very early date.

6. Copy of the supplementary report alluded to in paragraph 3 of the above letter will be submitted as soon as it is printed.

(True Copy and Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

Order—Mis. No. 3072, Revenue, dated 1st August 1896.

The results of the preliminary mineralogical survey carried out by Mr. Middlemiss fully justify the employment of a mining specialist for the conduct of a detailed practical investigation of the mineral deposits in the localities under survey, and the Government approves the Board's suggestions that Mr. Anderson should primarily devote his attention to a critical examination of the corundum areas in the Salem and Coimbatore districts and of the chromite and other mineral deposits of the Chalk hills in the former district in view to ascertaining their practical value, and that he should also arrange, if possible, to inspect and report on the mica-mining industry in the Nellore district.

2. The Government also concurs in the Board's view that a satisfactory working plan and the estimate of cost cannot be prepared except by a mining specialist, and it will accordingly be suggested to the Government of India that Mr. Anderson should be instructed to pay an advance visit to the Salem and Coimbatore districts for the purpose of preparing the necessary programme and forecast of expenditure in consultation with Mr. Middlemiss.

3. The Superintendent, Government Central Museum, will be requested to give effect to Mr. Middlemiss' suggestion that specimens of the Madukarai marble should be procured for exhibition in the Museum.

4. The supplementary report on the corundum localities in the Salem district referred to in paragraph 6 of the Board's Proceedings has since been received, and a copy of it has been forwarded to the Government of India with endorsement No. 2753-A, dated 13th July 1896.

5. The following letter will be despatched to the Government of India.

(True Extract.)

(Signed) A. T. ARUNDEL,
Ag. Secretary to Government.

Read—again the following G.O., Mis. No. 3280, dated 14th August 1896:—

Read—endorsement from the Government of India, Revenue and Agricultural Department, No. 2048—34-3, dated 5th August 1896, communicating the tour programme of the Director, Geological Survey of India.

Read—the following letter from the Officiating Director, Geological Survey of India, dated Calcutta, 31st July 1896, No. 1476:—

With reference to Government of India, Revenue and Agricultural Department, No. 982—22-3, dated the 18th April 1896, to your address, I have the honour to inform you that I propose visiting the Madras Presidency shortly and shall be at Ootacamund towards the end of August, when I will be prepared to arrange with you for the conduct of the Mineral Survey in Madras, which it is proposed to carry out through the agency of Mr. Anderson.

I will inform you of the exact date of my arrival later on, as soon as I am able to fix it.

Order—Mis. No. 3280, dated 14th August 1896.

Recorded.

Order—Mis. No. 3638, Revenue, dated 11th September 1896.

With reference to the correspondence read above and to the fact that Mr. Anderson's deputation to this Presidency has been unavoidably prevented, Mr. Middlemiss

will be requested to prepare and forward a rough estimate of the work to be undertaken and of the funds required for a detailed investigation of the corundum deposits in the Dharmapuri taluk of the Salem district.

2. It has been thought desirable that, for the present at least, operations should be confined to this particular tract, and on receipt of this information the Government will be in a position to decide as to the allotment of funds for the work and the deputation of an upper subordinate of the Public Works Department to superintend operations. It is understood that the Director of the Geological Survey of India will make arrangement to depute an officer possessing the requisite technical knowledge, to remain at the works under the general control of Mr. Middlemiss.

(True Extract.)

(Signed) A. T. ARUNDEL,
Ag. Secretary to Government.

ORDER—No. 2668 W., dated 19th September 1896.

Communicated to the Superintending Engineer, IV Circle, who will arrange for an upper subordinate being placed in charge of the proposed quarrying operations. He will receive technical instruction from the officer of the Geological Department, who will be deputed for the purpose, but will obtain funds from, and render accounts to, the Executive Engineer, Salem division.

(True Extract.)

Under Secretary to Government.

To the Superintending Engineer, IV Circle.
„ Examiner, Public Works Accounts.
„ Revenue Department.

Exd. T. K. Narayana Aiyangar.

F 2,000-18-2-96.
21

This does not seem to
a Public Works, but a
Geological Survey. As
such, it should, apparently,
be carried out under
the Revenue Dept. The
pencil addition to para
2 of the draft order
is accordingly suggested.

2668 W. 19 Sept 96.

It is not a Geological Survey
proper: but consists in
opening up
quarrying at the mine & in
the ordinary duties of the
Geological Survey.
I think my view is
that the money is to be
at the disposal of the
Department & an upper subordinate
is to be placed at the head of the
quarrying & technical in-
struction for the officer of the
Geological Survey who is to
work under & under his orders
at the Salem. It is
perhaps the proper arrangement
but necessary

9/9/96 P.O.

Under these circumstances
the Rev. Dept. order may
perhaps issue, unaltered
but it would be well to
amplify the order, as
overleaf, when it comes to
be issued in the P.W.D.
both the Executive and the
Accounts Branch would
then know how the case
stands -

L.S.
9.8.96

9/8/96

SAW Please note and
return - This refers to
an order about to issue
in the Rev. Dept. for
a Survey of the Corundum
deposits in the Salem
District.

L.S.
9.8.96

C.W.
noted and
returned -
C.W.
11.9.96.

P.W.D. No. 8383

F 2,000-18-2-96.
21

Gobt. of (1896) Madras.
REVENUE.

The Public Works
Dept.

Dated
Recd.

Encl.

Mis. G.O., 11th September 1896, No. 3638.
R.

Recd. 15/
Sept. 18.9.96
SUBJECT.

Requesting Mr. Middlemiss to pre-
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the work to be undertaken and of the
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the Dharmapuri taluk, Salem Dt.

urgent

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Communicated to the
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from, and render accounts
to, the Executive Engineer
Salem Division.

L.S.

16/9/96

16.9.96.

S. E. to write
Enar P.W. Dept.
Rev. Department.

8403A.

GOVERNMENT OF MADRAS.
REVENUE DEPARTMENT.

Read—again the following G.O., Mis. No. 1647, Revenue, dated 30th April 1896 :—
Read—the following letter from DENZIL IBBETSON, Esq., C.S., Officiating Secretary to the Government of India, Department of Revenue and Agriculture (Geology and Minerals), to the Secretary to the Government of Madras, dated Simla, the 18th April 1896, No. 982—22—3 :—

I am directed to invite attention to the correspondence on the subject of the deputation of Mr. C. S. Middlemiss of the Geological Department to the Madras Presidency and to forward a copy of paragraph 3 of a letter No. 597, dated 9th March 1896, from the Director, Geological Survey. My letter No. 3604—68—2, dated 11th December 1894, conveyed the sanction of the Government of India to the retention of Mr. Middlemiss' services up to the Spring of 1896 in order to complete the investigation of the corundum deposits in the Salem district; and it was said in the same letter that the Government of India would bear in mind the need for a more practical investigation of the industrial resources of the Madras Presidency after the preliminary examination of the Salem district had made some progress.

2. The Geological Survey programme for the five years 1895—1900, a copy of which was forwarded to the Government of Madras under endorsement No. 19—72—4, dated 25th September 1895, shows that it is proposed to employ Mr. W. Anderson, the Mining Specialist, together with Sub-Assistant Hira Lal in Madras during the field seasons of 1897—98 and 1898—99. The Government of India have only engaged the services of Mr. Anderson for a term of five years, which will expire at the end of September 1899, and they are desirous of framing a working plan and estimate of the total cost of the operations on which he is to be employed during the remainder of his term. Mr. Anderson's programme of operations in Madras will no doubt be framed with special reference to the results of the preliminary investigations which are being made by Mr. Middlemiss; and I am directed to request that the Government of India may be furnished with early information showing whether Mr. Middlemiss' survey has as yet yielded any results justifying the deputation of Mr. Anderson to follow them up. If so the Governor in Council will doubtless wish to lay down a special programme of work for that officer, and in any case, I am to request that as soon as information is available upon which they can be based a working plan and estimate of the cost may be prepared for the information of the Government of India.

Copy of paragraph 3 of a letter No. 597, dated 9th March 1896, from the Director, Geological Survey of India, to the Secretary to the Government of India, Department of Revenue and Agriculture.

3. As regards the work in the Salem and Coimbatore districts of Madras, which has been sanctioned for 1897—98 and 1898—99, it is almost impossible to frame a detailed programme now. In the first place, Mr. Middlemiss' Geological Survey of that area is not yet finished and the programme of work for Mr. Anderson will have to be framed with special reference to the results obtained by the former officer. And secondly, much will depend upon the special requirements of the Government of Madras which have not so far been ascertained in detail. The field of inquiry in Madras is of such great proportions, that Mr. Anderson will scarcely be able to examine more than a small portion of the area which Messrs. Middlemiss and Smith are now surveying, and their final reports will have to be awaited before deciding upon Mr. Anderson's programme of work.

Not Standing

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Read—the following letter from DENZIL IBBETSON, Esq., C.S., Officiating Secretary to the Government of India, Department of Revenue and Agriculture (Geology and Minerals), to the Secretary to the Government of Madras, dated Simla, the 18th April 1896, No. 982—22—3 :—

I am directed to invite attention to the correspondence on the subject of the deputation of Mr. C. S. Middlemiss of the Geological Department to the Madras Presidency and to forward a copy of paragraph 3 of a letter No. 597, dated 9th March 1896, from the Director, Geological Survey. My letter No. 3604—68—2, dated 11th December 1894, conveyed the sanction of the Government of India to the retention of Mr. Middlemiss' services up to the Spring of 1896 in order to complete the investigation of the corundum deposits in the Salem district; and it was said in the same letter that the Government of India would bear in mind the need for a more practical investigation of the industrial resources of the Madras Presidency after the preliminary examination of the Salem district had made some progress.

2. The Geological Survey programme for the five years 1895—1900, a copy of which was forwarded to the Government of Madras under endorsement No. 19—72—4, dated 25th September 1895, shows that it is proposed to employ Mr. W. Anderson, the Mining Specialist, together with Sub-Assistant Hira Lal in Madras during the field seasons of 1897—98 and 1898—99. The Government of India have only engaged the services of Mr. Anderson for a term of five years, which will expire at the end of September 1899, and they are desirous of framing a working plan and estimate of the total cost of the operations on which he is to be employed during the remainder of his term. Mr. Anderson's programme of operations in Madras will no doubt be framed with special reference to the results of the preliminary investigations which are being made by Mr. Middlemiss; and I am directed to request that the Government of India may be furnished with early information showing whether Mr. Middlemiss' survey has as yet yielded any results justifying the deputation of Mr. Anderson to follow them up. If so the Governor in Council will doubtless wish to lay down a special programme of work for that officer, and in any case, I am to request that as soon as information is available upon which they can be based a working plan and estimate of the cost may be prepared for the information of the Government of India.

ENCLOSURE.

Copy of paragraph 3 of a letter No. 597, dated 9th March 1896, from the Director, Geological Survey of India, to the Secretary to the Government of India, Department of Revenue and Agriculture.

3. As regards the work in the Salem and Coimbatore districts of Madras, which has been sanctioned for 1897—98 and 1898—99, it is almost impossible to frame a detailed programme now. In the first place, Mr. Middlemiss' Geological Survey of that area is not yet finished and the programme of work for Mr. Anderson will have to be framed with special reference to the results obtained by the former officer. And secondly, much will depend upon the special requirements of the Government of Madras which have not so far been ascertained in detail. The field of inquiry in Madras is of such great proportions, that Mr. Anderson will scarcely be able to examine more than a small portion of the area which Messrs. Middlemiss and Smith are now surveying, and their final reports will have to be awaited before deciding upon Mr. Anderson's programme of work.

Endorsement Mis. No. 1647.

Forwarded to the Board of Revenue for early report.

OOTACAMUND,
30th April 1896.(Signed) LIONEL DAVIDSON,
Ag. Under Secretary to Govt.

Read—also the following Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 3116, dated 24th June 1896 :—

Read—again the following Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 2651, dated 2nd June 1896 :—

Read—Endorsement from Government, Revenue Department, No. 1647, dated 30th April 1896.

Resolution—Forest Mis. No. 2651, dated 2nd June 1896.

Communicated to Mr. Middlemiss, with the request that he will submit at a very early date a report showing the results of his enquiries in this Presidency together with any suggestions for the programme to be laid down for Mr. Anderson, should the results obtained be such as to justify his deputation, and information that will enable the Board to frame the working plan called for.

2. Mr. Middlemiss is also requested to report what progress has been made in the revision of the provisional index of minerals—*vide* Board's Proceedings, No. 130 (Revenue Settlement, Land Records and Agriculture) of 1895.

(True Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

To C. S. Middlemiss, Esq., Superintendent, Geological Survey of India.

Read—also the following letter from C. S. MIDDLEMISS, Esq., Superintendent, Geological Survey of India, "Cottissa," Ootacamund, dated 8th June 1896 :—

In reply to the Board's Proceedings, Mis. No. 2651, dated 2nd June 1896, I have the honour to enclose a report dealing with such results as have been attained by my survey of certain minerals in the Coimbatore and Salem districts. Inasmuch as the Director of the Geological Survey of India in paragraph 3 of his letter, No. 597, dated 9th March 1896, to the Secretary to the Government of India, Revenue Department, has laid down that it is almost impossible to frame a detailed programme of work for the mining specialist, Mr. Anderson, until my preliminary survey has been finished, and inasmuch as the deputation of the mining specialist to Madras will overlap the period of my own deputation, it is evident that if the programme of work for Mr. Anderson is indeed to be dependent on work done by me, it must be framed on such preliminary and partial results as I can now and hereafter state before Mr. Anderson's arrival. The results given in this report must be understood therefore to be of a temporary nature, liable to modification in detail as further progress is made with my survey.

Such suggestions for the employment of Mr. Anderson as are therein made must also be understood to be inspired by what I have personally seen of parts of two districts only. I should not consider myself qualified or authorised to propose any work outside of those districts.

(2) With regard to the revision of Dr. King's Provisional Index of useful minerals, I have the honour to state that it is in progress and that I hope to issue it by the end of this month.

(3) A supplementary report on some new corundum localities will also be sent in by me.

ENCLOSURE.

Brief report on some minerals in the Coimbatore and Salem districts with special reference to the future deputation of a mining specialist to make practical investigations.

Obviously the first question requiring a definite answer from me is whether or not my survey has as yet yielded any results justifying the deputation of Mr. Anderson to this Presidency, with the object of following up those results. This question I can only answer in the affirmative. It is my belief that (taking one subject only for consideration) a practical investigation of the corundum areas, in the direction of determining the cost of getting the mineral on a large scale, is absolutely essential unless all the preliminary work done by me is to be thrown away. I have shown in my "Preliminary report on some corundum localities in the Salem and Coimbatore districts" that the area of productive rock is very large, that it is most probably capable of great extension, that the mineral is there in great abundance, but that the scattered distribution of it in the matrix is the one factor which makes a practical trial indispensable. Assuming then that on this account alone the need for an investigation by a mining specialist is paramount, I will now give a list of such mineral occurrences as have been, some more, and some less completely investigated by me, and which might need a specialist's attention. I divide them into two groups (1) those of more economic importance and (2) those of less economic importance.

(1) Those of more economic importance—

- (a) Corundum areas of Salem and Coimbatore districts.
- (b) Magnetite of Kanjamallai hill, Salem district.
- (c) Quartz-reefs of Kollegal and the neighbouring taluks.

(2) Those of less economic importance—

- (d) Chromite and associated minerals of the Chalk hills.
- (e) Haematite beds of Kollegal.
- (f) Marble beds of Madukarai.
- (g) Opal near Bargur.
- (h) Beryl near Kángyam.
- (i) Mica of Iddapaddi.
- (k) Potstone near Taramangalam.

I propose to take these mineral occurrences seriatim, giving a very brief resumé of such conclusions bearing on practical questions as I have been led to, and throwing out a few suggestions as to the direction a practical investigation should take.

(a) *Corundum areas of Salem and Coimbatore.*—For information under this head I refer the reader to my report, quoted above, and to the supplementary report which will be shortly issued. For making a thorough practical test of the value of the mines machinery must be employed, as to the nature of which I can give no advice other than that it must be capable of gently pulverizing the rock without grinding it to powder, after which a process of washing, or some other method depending on specific gravity, will serve to separate out the corundum.

(b) *Magnetite of Kanjamallai.*—The proximity of the rail to the magnetic iron beds of Kanjamallai makes it desirable to thoroughly determine their true value. It has long been known that a vast store of iron is present in the hill; and my own observations have tended to show that the lowest band which girdles the South, South-East and North-East sides of the hill is the only one that need be considered, inasmuch as it is the thickest and most probably the richest band. What is required here is a practical examination of this layer, bed by bed, all round the hill, to ascertain the percentage of iron in the richest parts. From my own observations I am inclined to think that the average richness of the ore has been considerably over-rated.

(c) *Quartz-reefs of Kollegal.*—A number of quartz-reefs in the Kollegal taluk, and the neighbouring taluks of Satyamangalam and Bhavani, and lying among the Northern forest covered hilly tracts of the Coimbatore district have been found to show a few traces of gold. A fragment of quartz from one of these found by myself near Kavudahalli on the site of the old Tippoo mines showed good visible gold, and yielded on analysis a little over 2½ oz. to the ton. I consider that it might be worth while to test practically some of these reefs in the field. As Mr. Anderson is at present testing the gold-bearing capacity of quartz-reefs in Chota Nagapur, he possesses all the necessary plant for this work.

The corundum mines, the magnetite of Kanjamallai, and the auriferous quartz reefs of Kollegal, are then in my opinion, the three matters of chief importance to which the mining specialist's attention should first be turned. If the Madras Government decides on selecting one or other of these for further investigation by Mr. Anderson, I shall be glad to give in a detailed report all the geological information that I have obtained on the subject. At present I do not think that it would be worth while burdening this report with technical minutiae.

(d) *The chromite and associated minerals of the Chalk hills.*—As in the case of the corundum localities, a report on this subject has already been made by me, and published by the Government of Madras. I need only refer to that report for such geological details as would be of

value for the mining specialist. I may, however, point out that, as the chromite is probably the most valuable mineral of that locality and the one about which exact information is wanting, it is therefore the one which should receive the first attention. So far as I have been able to ascertain it is not known whether the old mines worked by the Porto Novo Company followed a regular vein of the mineral or not: whether the vein, if it existed, was worked out or not: or whether the work was stopped for some other (*e.g.*, financial) reasons, or from water difficulties. Hence these are the questions which I would recommend for the mining specialist's attention if it is decided to employ him in this investigation. The work would probably entail extensive excavation in a disintegrating rock.

(e) *Hæmatite beds of Kollegal.*—A number of hæmatite beds were found during the late cold season by Mr. Smith and myself in the northern parts of Kollegal. The great distance of these from railway communication will probably be considered at present an insuperable obstacle to the working of them. But, should the mining specialist be required to investigate the auriferous quartz reef of Kollegal and the neighbouring taluks, he might at the same time give some attention to these iron ores. As before, it is needless giving geological details here, which will be combined in a special report if it be determined by the Madras Government to pursue the matter further.

(f) *Marble of Madukarai near Coimbatore.*—For the sake of completeness I mention these marble beds here, although it is doubtful whether a mining specialist could add much to our knowledge of them. The beauty and adaptability of the stone yielded by them for ornamental purposes has been practically demonstrated by the church at Coimbatore, where it has been largely utilized. I think if it were more generally known what handsome building material is available at this locality, a good demand for it would arise in Ootacamund and possibly in Madras. I may incidentally recommend that a series of large blocks of the white, grey and flesh-coloured varieties should be cut, polished and placed conspicuously in the Madras Museum (if this has not already been done); and that other steps should be taken to advertise the stone. At present, beautiful white marble is being used, rough-hewn and unpolished, for making drinking troughs for animals and for building walls. The general extent and thickness of the marble beds have been already surveyed by me. Full details could be furnished after another visit if desired.

(g) *Serpentine, opal and chalcedony near Bargur.*—A vein of serpentine a few miles south of Bargur in the Bhavani taluk was found by me during last field season. Among it occurs minute strings and veins of magnesite, chalcedony and common opal. In the brief examination I was able to make of the vein, I found no signs of precious opal, but the possibility of its occurring there should not be lost sight of.

(h) *Beryl (aquamarine) near Kángyam, Coimbatore district.*—Beyond tradition and report nothing certain is known concerning the actual occurrence of this mineral. I was unable to obtain any trace of it from the locality pointed out to me, nor by offer of a reward was I able to get any one to undertake a search. Some of the natives of Kángyam possess beryls strung together with prisms of green glass, the former being believed to have come from the locality. It is an open question whether a properly conducted search with mining appliances would bring more of these gems to light (see Coimbatore District Manual, page 23).

(j) *Mica, Iddapaddi.*—In the neighbourhood of Iddapaddi near Sankaridrug in the Salem district, there occur a few superficial workings in a vein of extremely coarsely foliated granite (segregation vein?). A small amount of mica has been taken therefrom. Plates as much as one foot square can be obtained at the surface, but most of what I saw was not very clear, and was spoilt in some instances by inclusions of minute plates of garnets. On separating the plates of mica the garnets fell out leaving small holes. It is possible that deeper working might reveal better preserved mica plates, but unless they can be found free of the garnet inclusions they would be useless for economic purposes.

(k) *Potstone, north of Taramangalam, Salem district.*—Near Chinnashoragai = Siannasorkai of map, 4 or 5 miles north-west of Taramangalam, there is a coarsely crystalline talc rock of inferior quality which is worked locally in two mines for the making of platters and bowls for the domestic use of Brahmans. I do not think it likely that a finer, more compact, and more valuable form of the mineral (steatite) would be found at this place.

Such then is a brief account of the more and the less important minerals which I have personally observed in the Salem and Coimbatore districts. In endeavouring to frame a working plan and estimate of costs for the subsequent more practical investigations by Mr. Anderson, the Board of Revenue will necessarily find that much depends on the particular mineral investigation which they decide to take up first. If the corundum areas are to be practically tested in the way I have indicated above, it will be necessary to consult with Mr. Anderson as to the methods and machinery which he will prefer to adopt, having regard to the nature and distribution of the mineral in the matrix as described in my report on the corundum areas. Until the requirements in this direction are known an estimate of costs cannot be prepared.

With regard to the magnetite of Kanjamalai, the requirements will perhaps be simpler, because the investigation there will merely be that of a series of analyses of a sufficient number of specimens of the ore to make it possible to arrive at a fair average as to its quality.

As regards the quartz reefs of Kollegal an estimate of the cost of testing them can, I should think, be fairly deduced from the similar operations now being conducted by Mr. Anderson in Chota Nagpur.

As regards the other minerals grouped under the heading "less important," I think it scarcely likely that any estimate can be arrived at until Mr. Anderson shall have seen the localities for himself and determined on the method of investigation in each respective case.

Resolution—Mis. No. 3116, dated 24th June 1896.

The second paper read above will be submitted for the information of Government with reference to its endorsement read in the proceedings above quoted.

2. It will be observed that Mr. Middlemiss considers that the mining specialist could be usefully employed in collecting more detailed and exact information than he has been able to obtain regarding the utilization of (1) corundum in the corundum area of Salem and Coimbatore, (2) the iron of Kanjamalai and (3) certain gold-bearing quartz reef in Kollegal, besides certain other minerals found in the area so far examined by Mr. Middlemiss.

3. A perusal of the report shows, the Board considers, that the deputation of Mr. Anderson to follow up the results already obtained is desirable, and it would suggest that that officer should, in the first place, devote his attention to solving the points mentioned by Mr. Middlemiss regarding corundum and chromite. In the case of the Kanjamalai iron, the investigation is already proceeding in a practical direction, and as to the gold-bearing quartz of Kollegal, it would appear to be sufficient to leave that to private enterprise. The facts collected as to the last area will, it is presumed, be published in Mr. Middlemiss' next report.

4. As to the preparation of a detailed programme of work and estimate of cost, the Board thinks that these can only be prepared by a mining specialist after he has made himself acquainted with the information already on record, and the circumstances of the locality. It would therefore suggest that Mr. Anderson should at a very early date pay a visit to the district and prepare the required programme and estimate in consultation with Mr. Middlemiss. The Board thinks that it would be well if Mr. Anderson could also arrange to inspect and report on the mica-mining industry in Nellore. The industry is one of daily increasing importance, as the demands for mica for electrical purposes are great and growing, and Mr. Anderson might be able to give suggestions both as to the conduct of mining operations and also as to places in which they might be conducted with advantage. Suggestions from him would be valuable, which would tend to the more economical working of mica mines, having especial regard to reducing the waste in the process of extraction and trimming. Any process by which mica waste could be rendered useful for electrical or other purposes should be brought to notice.

5. As to Mr. Middlemiss' suggestion regarding the placing of specimens of Madukarai marble in the Madras Museum, the Board would suggest that the Superintendent thereof should be instructed to give effect thereto at a very early date.

6. Copy of the supplementary report alluded to in paragraph 3 of the above letter will be submitted as soon as it is printed.

(True Copy and Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

To the Secretary to Government, Revenue Department,
with papers returned.

Copy to C. S. Middlemiss, Esq., Superintendent,
Geological Survey of India.

ORDER—Mis. No. 3072, Revenue, dated 1st August 1896.

The results of the preliminary mineralogical survey carried out by Mr. Middlemiss fully justify the employment of a mining specialist for the conduct of a detailed practical investigation of the mineral deposits in the localities under survey and the Government approves the Board's suggestions that Mr. Anderson should primarily devote his attention to a critical examination of the corundum areas in the Salem and Coimbatore districts and of the chromite and other mineral deposits of the Chalk hills in the former district in view to ascertaining their practical value, and that he should also arrange, if possible, to inspect and report on the mica-mining industry in the Nellore district.

2. The Government also concurs in the Board's view that a satisfactory working plan and the estimate of cost cannot be prepared except by a mining specialist, and it will accordingly be suggested to the Government of India that Mr. Anderson should be instructed to pay an advance visit to the Salem and Coimbatore districts for the purpose of preparing the necessary programme and forecast of expenditure in consultation with Mr. Middlemiss.

3. The Superintendent, Government Central Museum, will be requested to give effect to Mr. Middlemiss' suggestion that specimens of the Madukarai marble should be procured for exhibition in the Museum.

4. The supplementary report on the corundum localities in the Salem district referred to in paragraph 6 of the Board's Proceedings has since been received, and a copy of it has been forwarded to the Government of India with endorsement No. 2753-A, dated 13th July 1896.

5. The following letter will be despatched to the Government of India.

(True Extract.)

(Signed) A. T. ARUNDEL,
Ag. Secretary to Government.

To the Board of Revenue (Revenue Settlement).
" " (Land Revenue).
" the Director, Geological Survey.
" Superintendent, Government Central Museum.
Copy to Mr. Middlemiss.

Exd. C. M. Thambusawmy.

100 Copies.

Gob. of {1896} Madras.
REVENUE.

Issued

Recd.

Encl.

G.O., Mis. No. 3072, 1st August
1896.

AUGUST.

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Mineralogical Survey.

Passing orders on the subject of the further
— of this Presidency.

Revenue Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.
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Copy
attached.

Read again G.O.No.3072 Mis.,dated 1st August 1896.

Read again the following Government Order No.3280 Mis.,dated
14th August 1896:--

Read Endorsement from the Government of India,Revenue
and Agricultural Department,No.2048/34-3 dated 5th August
1896,communicating the tour programme of the Director,Geolo-
gical Survey of India.

Read also the following letter from the Officiating
Director,Geological Survey of India,No.1476 dated,Calcutta,
July 31st,1896:--

With reference to Government of India,Revenue and
Agricultural Department,No.982/22-8,dated the 18th April 1896
to your address,I have the honour to inform you that I pro-
pose visiting the Madras Presidency shortly and shall be at
Ootacamund towards the end of August,when I will be prepared
to arrange with you for the conduct of the Mineral Survey in
Madras,which it is proposed to carry out through the ~~A~~ agency
of Mr.Anderson.

I will inform you of the exact date of my arrival
later on,as soon as I am able to fix.it.

ORDER.

Recorded.

Mis

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ORDER thereon.No.3638,dated 11th September 1896.

With reference to the correspondence read above and
to the fact that Mr.Anderson's deputation to this Presidency
has been unavoidably prevented,Mr.Middlemiss will be request-
ed to prepare and forward a rough estimate of the work to be
undertaken and of the funds required for a detailed investi-
gation of the corundum/deposits in the Dharmapuri Taluk of
the Salem District.

2. It has been thought desirable that, for the present at least, operations should be confined to this particular tract and on receipt of this information the Government will be in a position to decide as to the allotment of funds for the work and the deputation of an upper subordinate of the Public Works Department to superintend operations. It is understood that the Director of the Geological Survey of India will make arrangement to depute an officer possessing the requisite technical knowledge, to remain at the works under the general control of Mr. Middlemiss.

(True Extract.)

H. Strundell

Ag. Secretary to Government.

To

The Board of Revenue, Revenue Settlement &c.

The P.W. Department.

Mr. Middlemiss.

Am
14-7