

Govt. of 1874 Madras.

PUBLIC WORKS.

To

Colonel Applegath

Dated.

Recd.

Encl. 1

G. O. 27th Feb 74, No. 1070

Nos. 330-331

Minerals

Letter from the Govt of India, forwarding copy of remarks by Mr. Foote on Col. Applegath's Notes on the mineral resources of the Kolna District, records of —

*Proceedings of the
Under Secy*

*From the Secy to the Govt. of India
Dept of Agriculture
Revenue & Commerce.*

*MS
2173*

*To Colonel Applegath & gen.
The Collector of the Godavari
District -*

*" " " of Krishna Dist.
Resident at Hyderabad.*

Board of Revenue.

Secy to the Govt. Central Museum.

Distric Eng. Godavari.

" " " Krishna.

*Mr Van Stavern thro' Dist. Secy
Godavari.*

Dist. Secy. S. C. S. S.

*Proceedings of the Madras Government, Public Works Department,
27th April 1874.*

No. 330. Read the following letter from C. J. LYALL, Esq., Under Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, to Colonel G. W. WALKER, R.E., Secretary to the Government of Madras, Public Works Department, dated Calcutta, 14th March 1874, No. 44 :—

Minerals.—WITH reference to the orders of His Excellency the Governor in Council, No. 1,020, dated 30th September 1873, published in the Proceedings volume for the same month (Public Department), I am directed to forward herewith, for His Excellency's information, copy of a few remarks submitted by Mr. R. B. Foote, Deputy Superintendent of the Geological Survey of India, on the notes drawn up by Colonel Applegath on the subject of the discovery of coal and diamond strata and other valuable rocks and ores in the Kistna District.

Notes on Colonel APPLGATH'S Map of the Juggiapetta "Coal-field."

COLONEL APPLGATH claims to have discovered coal on the banks of the Pallair river, a little northward of its junction with the Kistna, and concludes that a coal-field exists to the south of the town of Juggiapetta, and urges the Madras Government to make further borings, and adduces evidence in support of his proposition. Having, by Dr. Oldham's instructions, carried out the geological survey of that immediate neighbourhood, and arrived at conclusions diametrically opposed to Colonel Applegath's, I wish to make a few comments on the map and letter of explanation and suggestions for borings forwarded to the Madras Government by that officer.

Colonel Applegath's map gives a much less accurate idea, even of the mere geography of that quarter, than the atlas sheet No. 75, though the latter is on a less scale.

His map is constructed in many parts without reference to the great stratigraphical features of the country.

The great rock series lying south of Juggiapetta, in which the "coal-field" is supposed to be, was divided by me into seven sub-divisions, and described at some length in the appendix to Mr. King's report on the Cuddapah and Kurnool formations (Memoirs, Geological Survey of India, Vol. 8, Part I.) to which the Juggiapetta rocks belong. Only the four lowest divisions of the series are concerned in the subject under discussion. The following is the statement of the whole series in descending order :—

- 7.—Pulichinta ridge quartzites.
- 6.—Chocolate slate series.
- 5.—Jatapalle quartzitebed.
- 4.—Ginjupalli series of gritty quartzites and shales in alternating bands.
- 3.—Palnad limestones.
- 2.—Juggiapetta shales (or slates).
- 1.—Juggiapetta quartzites, including a thin bed of dark-colored shales near the base.

When Colonel Applegath took Dr. Oldham, in company with Mr. A. J. Stuart, M. C. S., and the late Mr. C. Æ. Oldham, over this ground in 1868, some small pits were dug close to the spot where the coal was obtained in the banks of the Palliar river. These pits remained at the time of my visit early in 1869, and were pointed out to me by Mr. Densem, the European Inspector of Police at Juggiapetta, who had seen them dug. They do not, however, correspond in locality with the spot "H." indicated on the Colonel's map, but rather lie opposite to the upper extremity of the three green-colored islands shown in the map. I could find no trace of the horizontal opening made in 1851, so am uncertain as to its exact position. If the coal was found at H., it belongs by position most likely to the Juggiapetta shales (2) of the above list of formations. If it was found near the spot shown to me by Mr. Densem, it would belong by position to the lower part of the Ginjupalli series (No. 4), which here occupies its normal position, strati-

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graphically considered; whereas No. 2, nearer to Raveralah, has been brought up to the surface by a fault.

With regard to the actual discovery of coal, which the Colonel burnt in heaps at the time, I would point out that the coal-seam, if seam it was, that he hit upon must still be there, although no outcrop of it can be found. Why did he not prove the existence of that seam when he had the detachment of Sappers and boring machinery with him in 1870?

The whole of this part is but very thinly covered with soil and very sparsely scattered bushes, so that the rock is seen almost everywhere, over the surface generally, and in all the numerous rain-gullies, yet nowhere is there a trace of carbonaceous shale to be seen *in situ*, nor a pebble of it in the beds of the water courses. The rocks are pale, mostly drab-colored sandy shales with thin bands of shaley sandstone. What Colonel Applegath calls black and blue shales, I, of his map, I noted as grey or purplish, *never black*. Similarly, with the limestones at E. E., I noted them as dark grey or dark blue grey, *never black*. Whichever shale series the Colonel's coal-seam may be assigned to, either is exposed in that neighbourhood over many square miles, almost bare of soil and vegetation; and it is certainly a very singular fact that no outcrop of coal should be seen anywhere if coal occurs in the series, nor a single outcrop of carbonaceous shale, nor even, as far as my very extensive and close examination went, a very dark-colored shale!

The "boulder beds" mentioned under B. B. in the description of the map I cannot identify. That indicated in the valley of the Chillaculloo nullah I did not visit, as the spot it occurs in is quite beyond the limits of the "coal-field," in the gneiss area, and had already been mapped by Mr. Charles Oldham. That indicated to the west of Mucktiallah (Moogetalah of sheet 75) I am quite at a loss to understand. I went repeatedly (five times or more) over that ground, when encamped at Mucktiallah, but saw nothing but the edges of the limestone outcrops, which are very numerous there. Here and there are a few blocks or lumps of a local quasi-lateritic formation of no importance, formed by aggregation of lateritic pellets which occur largely there in the red soil. They lie on the surface of the limestone.

On the "mud silts" of Boodada I can offer no remarks. I did not go there, as Mr. C. Æ. Oldham had already mapped that quarter, as also the immediate environs of the town of Juggiapetta. As the quartzites forming the basement bed rest on the rugged and often hummocky surface of the granitic gneiss, both here and for many miles to the south, the appearance of a boulder bed is frequently to be met with; but there has been no drifting of the enclosed blocks; they were merely covered by the sediment which was deposited around and over them.

The tessellation of the sandstones, which the Colonel adduces as evidence of the Talchir age of these lower formations, occurs in other sandstones irrespective of geological age; it is frequently to be met with in the Rajmahal beds of the Madras District.

Under F. F., and again in the 4th paragraph of his "suggestions for borings," Colonel Applegath describes some supposed outcrops of coal between the Kistna at Vadadry and the villages of Peddarum (Peddavarum of sheet 75) and Posumputty, respectively. They are described as "*outcrops of black squarish vesicular-looking leaden-colored rocks, very hard to break with the hammer (outcrops of coal), numerous between Peddarum village and the Kistna,*" and again as "*black rough vesicular-looking rocks, with a variegated leaden and brownish grey color, very hard to break with a hammer.*" This description will not answer for any coal outcrops, but it does answer admirably for the dykes of hard basaltic trap occurring so numerous just outside the quartzite boundary on the paths both to Peddavarum and Posumputty. Those indicated in his map are represented as east of or outside the quartzite boundary ridge, and therefore within the gneissic area. Several have a course parallel with that of the Kistna river, a point the Colonel specializes. Nothing within the area of the Juggiapetta rocks answers to the above description. The little outcrop mentioned as occurring on the path between Juggiapetta, Agraharam, and Mucktiallah I cannot identify; there is nothing there corresponding to the description, certainly no trap dyke. I am certain as to that, as I passed by that road several times, and should have mapped any peculiar feature in the rocks.

The "burnt or crushed outcrops of shale or coal" mentioned under P. P. and in paragraph 5 of the suggestions, I can make nothing of; I don't know what the term is meant to describe,

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neither can I recall to mind anything* presenting any appearance of a great burning having taken place on the western flank of Noonee Conda, and I have not indicated anything on the map. I know the hill well, having been round its flanks several times, and as well as twice all over the summit and ridge. The hill is on its west and north-west flanks, so bare of soil and vegetation that it reveals its structure quite clearly. It is formed of the different shales, sandstones, and quartzites of the Ginjupalli series (4), capped by a strong *quartzite bed*. On its southern and eastern sides these quartzites and shales are faulted against the underlying limestones (3). As above mentioned, the hill is capped, not by a "small bed of limestone," but by a strong and very typical bed of quartzite, as shown distinctly in Section IV. accompanying the report before referred to.

The mere fact that a sandstone is felspathic will not offer much evidence as to its geological age; and it would be hazardous to conclude on that ground only that the rocks forming Noonee Conda are of Damooda age, and hence promise coal.

The "bluish-grey sandstone" or quartzite occurring at the wells 2 2 on the road from Vadadry to Peddarum, and supposed by the Colonel to be a Raneegunge rock, lies near the top of the Juggiapetta quartzites † (1), to which it belongs, and rests, not on coal, but on a considerable thickness of other quartzites, with only one thin bed of shale near the base, so the wells would hardly seem a promising locality at which to try a boring.

With regard to the black carbonaceous sandstone obtained in the pit S. in 1870, which evidently has a thickness of several feet, it must, if forming a seam or continuous bed, surely show some indication of outcrop on the hillside, a very little distance below the mouth of the pit, the dip of the beds being south-east into the hill. Some pebbles of this carbonaceous bed must surely occur in the rain-gullies which run into the Vadadry nullah, and the pebbles in both of which I examined most carefully at many spots without finding the faintest trace of carbonaceous rock of any kind whatsoever.

It will be seen by the map that a bent line of fault divides the slaty series forming the western slopes of Noonee Conda from the limestones of the Streemuganaickdroog ridge. As the slaty series dips south-eastward at a considerable angle, Colonel Applegath's carbonaceous bed will, if continuous, occupy a rudely triangular area of very limited extent, whose very obtuse apex will fall into the bend of the line of fault.

The other pits, T. and U., are sunk in the lower or Juggiapetta shales series, and of course show a totally different succession of beds.

Under J. J. "grey underbeds (fireclays)" are mentioned. Mere lithological resemblance in the absence of fossils is utterly insufficient for any correlation of rocks in different and widely-separated formations. Colonel Applegath has yet to prove that his clays underlie coalseams, and once constituted the original soil in which the coal plants were rooted, before he can establish the clays as true underbeds.

The "granite bosses" M. M. I cannot recognize. There are no intrusions of crystalline rocks in that quarter, nor indeed any inliers of the older rocks, except that to the north-east of Pulichinta, which has been brought in by faults, as shown in the map. Colonel Applegath must have been misled by finding the quartzites of the ridge north of Vadadry locally much cut up by little veins of quartz, which occur in great numbers.

His "ironstone shales V. V.," containing fossils, I cannot identify with anything I can recollect, and I have not noted any ferruginous rock in the map to the north of Vadadry in the locality occupied by the shales V. V. As to fossils which the Colonel claims to have found at K. K., N. N., O. O., and V. V., I can merely say that I failed in those very localities in finding anything of organic origin, though I devoted much time to searching; but I found numerous stainings and pseudo-organic impressions among the shale beds and quartzites, by which a person without palaeontological knowledge would very likely be deceived.

* My note book of that season's work is unfortunately not available at present, being packed up in Madras.
† And therefore really underlies the Colonel's supposed "Talohir mud silts" at Boodada.

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The small piece of coal attached to a piece of green stone" found at X. X. in the large nullah which falls into the Kistna immediately above Chintapilly was (I venture to suggest) a bit of black hornblende attached to part of a pistacite vein from the gneissic rocks among which the nullah rises in the Venkatayapalem valley.

At paragraph 7 of the suggestions for borings, Colonel Applegath says, "Wherever letter I. is written in the map there is a *brown* micaceous shale (thin and stratified) or *brown* micaceous sandstone (thicker, but of the same composition);" but under the heading II. in the "description of map," he says, I. I. represents "black and *blue* shales on the west bank of the Pallair river." The Colonel further adds in paragraph 7—"the first mentioned on the Kistna is absolutely identical with the lower Panchet micaceous shale of the village of Deoli, Ranigunge coal-field." The beds I. I. (on the west bank of the Pallair) dip eastward, and must therefore underlie Colonel Applegath's first discovered coal, which lay on the east bank at II., supposing that coal to occur in the upper or Gingupalli shale series. If the coal belong to the Juggiapetta or lower shale series (the exact locality of II. being doubtful,) the bed I. will be cut off by the fault running west of Raveralah. In paragraph 9, it is stated that, "on the eastern hill" (part of Streemuganaick-droog hill) "we have the thin grey micaceous shale, another of the lower Panchet beds." The latter shale is certainly at a much lower horizon than the beds I. I. on the bank of the Pallair, and the latter are very much below the horizon of the carbonaceous bed found in pit S. sunk on the bank of the Noonee Conda. Colonel Applegath's second carbonaceous bed is then well up in the Panchet series, which has nowhere in Bengal or Central India been found to contain coal.

In the 11th paragraph of the suggestions, the discovery of a *zamia*, "*zamia, spiralis* (Australia)," in rocks which in reality occupy the same horizon as those which Colonel Applegath believes to be of Talchir age, will not readily be accepted by palæophytologists. The blue shales near Q. must occupy a position very nearly the same as the "Talchir silt" of Boodada.

There are several mistakes in the Colonel's map requiring to be noticed:—

First, Congramulla hill forms a very conspicuous outlier, separated by a valley three-fourths of a mile wide (full of granite hummocks and tors traversed by several trap dykes) from the main area of Juggiapetta quartzites. Second, there are no breaks in the continuity of the outcrop of the northern and southern boundary ridge of quartzites, where crossed by the Vadadry and other nullahs. Third, there is no outlier of quartzite north-west of Peddavaram, as shown in the Colonel's map. There is a jutting spur of quartzites, but it is joined to the main boundary ridge at its northern end. Fourth, the deep bay of gneiss rocks running up east of Contrainpully is ignored entirely, and the boundary ridge placed much too far east instead of closely parallel to the river and touching the several villages along its bank. Fifth, Owintapilly and the island adjoining it in the Kistna are placed much too far north, and the island consists of granitoid gneiss, not of quartzite. Sixth, the northern boundary between Juggiapetta and the Congramulla is not even indicated correctly, though formed by high ground terminating in a well-marked bluff scarp.

In conclusion, I would remark that Mr. King's Singareny coal-field shows a totally different series of rocks from those forming the Juggiapetta corner of the Kaddapah Karnul areas, and that the Singareny rocks are not in any way metamorphosed. Moreover, they rest upon Vindhyan rocks, having a very strong resemblance to the Juggiapetta rocks.

If the presence of diamonds in the Juggiapetta quartzites and gritty beds is to be considered as evidence by fossils of the age of the series compared with those lying further north in Central India and Western Bengal, the evidence will not be in favor of the Colonel's views; for no diamonds have ever yet been found in the Talchir, Damoodah, and Panchet rocks, but only in the much older Vindhyan at Panna, to which the Geological Survey that have seen them. The Juggiapetta series is referred by the members of

All the diamond mines in the Juggiapetta area and near Pintapilly are, I believe, now abandoned. None of those I visited were then worked; or appeared to have been touched lately. Those belonging to the Nizam have not been visited by the Geological Survey, as far as

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I know, unless Mr. King has visited Mullailly within the last three years. The valley of the Moonyair river and the Condapilly hills are still *terra incognita* to the survey.

I cannot correlate the Colonel's list of diamonds bearing rocks with those I ascertained to be such, for his descriptions do not agree with mine, and, moreover, he does not state whether it is given in ascending or descending order, or whether there is any sequence at all amongst them.

There is no doubt, as indeed Colonel Applegath implies, that the Kistna is a far larger and finer river than the Damoodah; but that is really no reason why it should have any coal-fields on its banks, and so far I think he has utterly failed to establish even one.

R. B. FOOTE, F.G.S.,

Geological Survey of India.

No. 331. ORDER THEREON, 27th April 1874, No. 1,070.

CIVIL WORKS, No. 39.

(True Extract.)

(Signed) G. W. WALKER, Colonel, R.E.,
Secretary to Government.

To Colonel Applegath.

To the Collector of the Godavery District.

" " of the Kistna District.

" Resident at Hyderabad.

" Board of Revenue.

" Superintendent of the Government Central Museum.

" District Engineer, Godavery.

" " Kistna.

To Mr. Vanstavern, through District Engineer, Godavery.

To the Public Department.

Ed. E. C. Shunker.
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1874/5/6/74

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PUBLIC WORKS.

To

COLONEL APPLGATH

&c. &c. &c.

Dated April 27th.

Encl.

Recd.

G. O., 27th April 1874, No. 1,070.

APRIL

Nos 330-331

Minerals.—Letter from the Govern-
ment of India forwarding copy of remarks
by Mr. Foote on Colonel Applegath's
notes on the mineral resources of the
Kistna District, recorded.

7th Sept

Madras Government.
11th March 1874.
Recd the following.

Here enter 14th of 14 March
1874

Ordered to be
recorded.

C.M.W.

to Madras and my Pilly for despatch
to England - 7/5/74

12 to all 7/6/74.

330-331