

A large collection of very beautiful specimens of rocks and minerals have been received from the Revd. Mr. Muzzy illustrative of the Geology of Madura, but amongst them were only a few marbles and the specimens of the marbles from those three southern districts may therefore be described together.

Nos. 8 and 9—are two specimens of dolomitic marble from Manarcotta in Tinnevely. They are somewhat soft, effervesce feebly with acids, are of a faintly yellowish white, and seem well adapted for sculptural purposes. The place where these specimens are found is within three miles of the high road from Madura to Palamcottah, and north of where the Tuticoreen road branches off from it, and in point of facility of transport no locality could be more favorable. The Tahsildar reports that the rock crops out above ground, over a space of about an acre and he supposes that it extends far beneath the surface.

There is another interesting specimen of marble from the South of India, which I have failed to ascertain the precise locality of. It reached me along with several rock specimens all of them in the form of round balls and seemed to have been sent from Tuticorin, but all my enquiries have failed to elicit who sent it to me or where it was despatched from. The Revd. Mr. Muzzy to whom I referred it for examination thus describes its characters.

"It appears to be highly crystalline limestone embedding minerals resembling rubies, cinnamon stone, a greyish green pyroxene, and a finely fibrous mineral resembling mesotype or borate of lime. It is a very interesting mineral and I must take a little more time to examine it before I can be at all confident." 29th. After examining the mineral I am convinced that the red and yellow grains are chondrodite, which by Nicol is classed among the gems; but is composed mostly of silica and magnesia, iron and ?; and the fine fibrous crystals which encrust a part of the limestone are, I think, the botryolite variety of borate of lime. I should think the stone would be useful as a marble like the Jeypoor marble. Its crystals however are rather large."

If these remarks meet the donors eye perhaps he will kindly mention where the marble was obtained. The specimens he sent were 10 in number and were all in the shape of round balls, about two inches in diameter.

CCIX. No. 41, is a reddish white magnesian limestone, highly crystalline, from Madura, and suited for ornamental purposes.

No. 104. Amongst the Madura rocks is a large crystalline magnesian limestone from Poovandy and suited for sculptural purposes.

No. 106, is a pale buff colored magnesian limestone from Jaffna suited for lithography.

No. 134, amongst the lime group of rocks in the Geological department, is a hard shell limestone from Madura, sent by the Revd. Mr. Muzzy. It resembles and is suited for purposes similar to No. 48 from Ootatoor. D.

No. 103. Is a specimen of white granular limestone from the Madura district—presented by the Revd. Mr. Muzzy suited for all the purposes of statuary. M.

No. 37. Fossil marble from Cape Comorin.

No. 39. Yellow, pink, and grey, limestone conglomerate, crystalline, containing fossils, cut and polished, from Cape Comorin: is a pretty marble.

No. 40, is a crystalline white marble sent from Travencore by Lieutenant General Cullen, and similar in quality to the best Moulmein marble. It is suited for sculptural purposes.

Nos. 42, 43, 44, and 45, are finely polished specimens of brownish magnesian limestone, from Cape Comorin. They are yellow, brown, and blackish grey in color and are suited for ornamental purposes.

No. 49, is a polished yellow, fossil, limestone conglomerate, sent from Cape Comorin by Lieutenant General Cullen. It would be deemed ornamental by many.

No. 47, is a yellow fossil marble sent by Lieutenant General Cullen from Cape Comorin, suited for ornamental purposes. M.

CANARA MARBLES.

The only marbles received from this part of Southern India, have been presented by Dr. Leslie of Honore, they consist of two varieties of whitish, finely crystalline, siliceous limestones, very prettily streaked with wavy lines of blue, they effervesce slowly with acids but they seem a valuable material suited for all the ornamental purposes to which marble is put: they are marked,

Nos. 1 and 2, and were obtained from a very remarkable clustre of rocks in the district of Canara called the Yan or Yana rocks. The rocks are situated at the foot of the ghauts, on the western coast, about 25 miles from Honore and rise abruptly out of the jungle to the height of about 500 feet: no better idea of their form can be given than by comparing them to a gigantic ant hill, their summits terminating in sharp points, their sides deeply plaited and furrowed with occasional perforations and arches: there are two masses, one of very great size, in the centre of which is a large cavern.

SELECTIONS
FROM
THE RECORDS
OF THE
MADRAS GOVERNMENT.
PUBLISHED BY AUTHORITY.
Nº. II.
REPORT
ON THE
GOVERNMENT CENTRAL MUSEUM.

Madras:

PRINTED AT THE PORT ST. GEORGE GAZETTE PRESS.
1854.

BURMAH AND TENASSERIM.

The tin, coal, &c. of our territories, on the eastern shore of the bay of Bengal, have been well described by Captain Tremenhere and others; and that part of our empire though garrisoned by the Madras Army, being under the political charge of the Supreme Government, I will restrict my remarks to enumerating the following few specimens of the limestones which have been received from Burmah and the Tenasserim Provinces.

No. 1. From Rangoon is a slab of soft pure white, gypseous marble, with large crystals; said to be from Burmah.

Nos. 18 and 37 are grey crystalline limestones of which Lieutenant Norris sent several specimens, from Moulmein, where it occurs in immense ranges abutting on the rivers, admitting of boats being loaded with it, with the utmost facility. It appears to be burned on that coast and converted into lime: it would take a good polish, but the color is a dull blue and from two out of the three specimens, as yet sent by Mr. Norris, containing interstices filled with larger crystals, it seems only applicable to building purposes. Mr. Norris asks if it might be imported into Madras as a commercial speculation but I do not think that it would suit as a marble. As a building material or as a substance to prepare lime from it is well adapted, it would, however, be well to have other specimens of it before giving a decided opinion regarding its capabilities.

UNKNOWN LOCALITIES.

There are still a few limestone rocks from localities which are not known to me, but as they resemble other of the marbles of this presidency I add a description of them, here, too.

CXXXII. No. 1. Lithographic slate composed of carbonate of lime with a trace of iron locality unknown: looks like the limestones of Juggiapettah.

CXXXII. No. 2. Lithographic slate composed of carbonate of lime with a trace of iron; locality unknown: looks like the limestone of Juggiapettah.

MARBLES OF EUROPE.

The specimens of European marbles in the Museum have been the gifts of Mr. Deschamp and Mr. Ostheider, they are a very elegant series of the crystalline and compact limestones of England, France, and Italy—and are of much value as affording the means of comparison with the rocks of this country.

No. 1, is a specimen of a very finely crystalline marble, of an intensely black color. It so strongly resembles a piece of basalt, that the chemical test of an acid had to decide its character.

No. 2, is also an English marble very black but containing some points of a whitish color, apparently from some crystallised fossil remains. These are specimens of the Lucullan (Nero Antico) marbles, and No. 2 is probably from Kilkenny.

No. 3, is a specimen of the Lumachel marble known as the Lumachelle Ménigon: The base of this specimen is of a deep grey, and the shells in it are curved, large, and of a greyish white color.

No. 4, is another of the Lumachel marbles known as Lumachelle Pont Vieux. The base is a brownish white and the shells are of a black and greyish black color.

Nos. 5, 6, 7, 8, and 9 are all Breccia marbles or Brocatellos.

No. 5, is known as the Brèche Africaine, and consists of portions of an intense black marble imbedded in a shining, reddish brown matrix.

No. 6, is called the Medoux Jaune marble, and consists of black, white, and ochre yellow breccia, imbedded in a brownish yellow matrix.

No. 7, is a breccia of greyish white marble imbedded in a reddish base. It has the name of Bize Rose, and is said to be from the Pyrenees.

No. 8, is a yellow breccia in a cherry red base, said to be from Italy.

No. 9, is a brownish black breccia in a reddish grey base—said to be from France.

No. 10, is a jaspery looking marble of a deep red, veined with darker red, called "Campan Griotte."

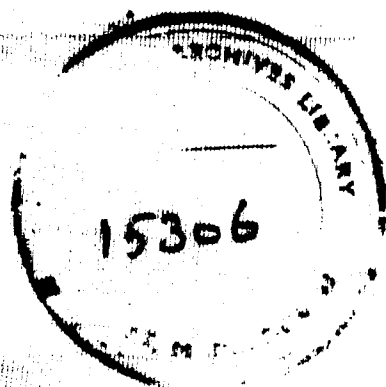
No. 11, is called campan vert and said, like the last, to be from the Pyrenees.

No. 11 a, is called campan melangé œil de perdrix. It is a prettily mixed mass of red and green, and reddish grey, veined with deeper green.

No. 12, is the yellow marble from Sienna.

No. 13, is termed in France Amaranthe Cachemire, and is a deep red marble veined and pointed beautifully with seams of white and red and yellow.

Nos. 14, 15, 16, 17, 18, 19 and 20, are all of them grey marbles more or less veined, variegated and pointed with black and white.



Sir,
The Right Honorable the Governor of Madras in Council being in possession of the full report which, at the close of the half year ending 30th June 1853, I had the honor to present, on all connected with the rise and progress of the Central Museum and on the condition which the Institution had, up to that time, attained, it is not, again, required of me to enter minutely into the details of the Institution: and I have here, therefore, but very briefly alluded to some necessary matters and have availed myself of the leisure thus afforded me to prepare a report on the crystalline and compact limestones of the Madras Presidency. As the Museum has only, as yet, been 28 months in existence, some may, perhaps, deem it premature, to commence the preparation, from its materials, of reports on the products of this country; but it is at all times of great utility to bring our knowledge of any subject up to the present day,—so as to admit of enquirers proceeding onwards from the point thus attained, and I would deem this, of itself, a very sufficient reason for preparing this report on the Madras Marbles, however imperfect it may be. But the collection of specimens of marble has shared in the great general progress of the Museum and, having repeatedly marched over and resided in the districts on the watershed of the Godavery, the Kistnah, and the Pennar, which the great bulk of the specimens have been received from, I think that Government will be pleased to receive this report on them, as well for the information it contains as because, as the first of a series of reports on the products of this country, it may show the advantages which can be derived from making a proper use of the specimens accumulated in the Museum.

No. 14, is from the Pyrenees—and is called Solitaire. It is a grey, with watered like lines of a blacker grey.

No. 15, is called St. Anne granité, and is a grey marble prettily pointed with grains of white, whence its name.

No. 16, is called St. Anne Francais and is a blackish grey, veined with a lighter grey and having seams of white.

No. 17, is from the Pyrenees and is called Aspin Coquillé. It is a deep bluish grey with seams and whorls of white.

No. 18, is a wavy ash grey marble from France, with a very splendid polish.

No. 19, is a pure white, French, marble, veined with deep black.

No. 20, is a slab of French marble, with seams of reddish white and blackish grey.

No. 21, is pure white saccharine called also saline and also statuary marble, without a spot, and said to be of Carrara.

No. 22, is said to be of Bourdeaux in France. It is white with greyish or greenish veins, and is of less beautiful texture than the last.

No. 23, is a slab of Italian alabaster, pure white, and translucent.

No. 24, is a coarsely laminar limestone of a brownish color, compact and known as oilstone of Lorraine.

No. 25, is a fine compact limestone of a pale cream yellow color, and called Belgian oilstone.

LITHOGRAPHIC LIMESTONE.

The art of Lithography has attained such importance and the German slabs employed in the process are still so costly that I offer no apology for describing, here, the various specimens of lithographic limestones which the Museum contains. Different Societies, have offered, from time to time, rewards for the discovery, in Britain, of a limestone suited for purposes of lithography, but, though thus stimulated, none has as yet been discovered there, and the best stones are still brought from Germany. The best specimens of the variety of limestones used in this art is a compact, close grained rock, of a cream or buff yellow, or pale ash grey, or whitish brown tinge and susceptible of a good polish. The spotted varieties are not good, because, in such, the texture is not homogenous and, if worked from, their different portions would give different impressions.

It is now thirty years ago since Lieutenant Colonel Garrard, then Chief Engineer at Madras, established a lithographic press in his office; and, desirous of being independent of foreign supplies, he caused search to be made in this country for limestones suitable for lithography. He ascertained that they were procurable in any quantity and of excellent quality, from Kurnool in the Ceded districts, from Datchapilly in the Guntoor Collectorate, and from Condapillay in the Collectorate of Masulipatam, and he considered their discovery the more important because of the proximity of these places to the Tumbodra and Kistnah rivers down which they might be transported to Masulipatam; one specimen obtained from Bellary, Colonel Garrard reported (24th April 1827) to be "fully as suitable as, if not even superior to those which had hitherto been obtained exclusively from Germany," and he then recommended a supply being brought to the Presidency for use and for shipment to Bombay and England. After subjecting these stones to trial,

Letter to Revenue Board, 26th November 1826.

Letter to Chief Secretary, 20th September 1828.

Colonel Garrard reported the Kurnool stone, to be of a finer grain and much harder than the German, its specific gravity being about 271; and if charged with ink suited to its texture (which should be more fluid than that generally used,) it would give impressions very nearly, if not quite equal, to those from copperplate: that the stone received from Datchapillay is as hard as those from Kurnool, and it has the same specific gravity; and that the Juggiapettah stones although softer and of a coarser grain than those obtained from Kurnool are extremely well adapted to all general purposes, and are likely to prove equal to German ones (p. 310).

About 20 years ago, these Kurnool stones were also used by Colonel G-

R. Jervis of the Bombay Army, for the lithography of numerous publications and found to answer exceedingly well: notwithstanding which, even now, at Bombay in the Chief Engineers Office, European stones are used because such are supplied from Government stores.

Colonel Jervis makes no mention of the lithographic limestones of Kulladghee which the Museum contains many specimens of. Major Jervis of the Bombay Engineers, however, about 20 years ago quarried many of the limestones of Kulladghee and sent them to Bombay,—and those from that Cantonment which Major Burn of the Madras Army, presented in 1850, have been tried here and found to answer well. Of the limestones, in the Museum, the detailed description of which I will now give, Nos. 13, 11, 21, 36, 37, and 38, have all been tried in lithographing and no doubt rests with me that, for all ordinary purposes, they are adapted for use in the public offices, and that for such there is no necessity for Government being at the

from the 9th December 1853, on a salary of Rupees 8-8-0 per mensem, and another Mahomedan writer, Syed Mahomed, on a salary of Rupees five per mensem, and from the necessity for a third Humal to sweep the place, I have entertained Veerasawmy in that capacity.

I have also considered it necessary to order the salary of the Curator P. Rungasawmy to be increased to Rupees 20 per mensem from January 1854. The diligence and attention with which he performs his duties, his increasing usefulness and the increased responsibility thrown on him by the largely increased establishment* rendered it but just that his salary should be increased.

* At the early part of last year I tried to form a trade department in the Museum, by writing to the Chamber of Commerce here on the subject, the letter No. 79 Appendix C, but I regret to mention that I have not received any reply to that communication.

In my letter of the 27th April last (Appendix D.) The Right Honorable the Governor in Council will find the suggestion which I made to have a department of Geographical Geology opened in the Museum at the India House, and, conscious of the advantages to the Government,—the engineer and the man of science, that would be derived from such a department, I trust that that suggestion may be carried out.

My letters of the 14th, 28th July last made suggestions as to the location of the Madras Central Museum, which is a subject of much importance to the future usefulness of the Institution and I beg that it may continue to receive the best attention of Government, and my letter of the 28th November 1853, suggesting the commencement of maps of a size suitable for the purposes of the Geological Surveyor, will lead, I hope, to their preparation.

These necessary details being thus briefly alluded to, I will, now, proceed to describe the specimens of crystalline and compact limestones collected into the Central Museum, from the various parts of the Madras Presidency, introducing the subject with a few prefatory remarks on marbles generally, which, in this country, where books cannot readily be referred to, may be useful in enabling others to prosecute the subject further.

One hundred and fifty

specimens of the various

limestones collected in

the various parts of the

Madras Presidency

are now deposited in

the Central Museum

at the India House

at Madras

for the purpose of

being referred to

in the various

parts of the

MARBLES OF THE MADRAS PRESIDENCY.

INTRODUCTORY.—Any limestone which is sufficiently hard to take a fine polish and is available for sculptural or decorative purposes is technically called a marble: marbles, therefore, are by no means rare but only a very small proportion of the compact limestones are of such quality as to be serviceable as a very ornamental material, the greater part of them being of unattractive color, and devoid of uniformity in substance while their numerous fissures prevent their being worked in large masses, although they are used as a building material in many parts of the world. Most marbles consist of those varieties of close textured limestone, presenting no evident crystallization, which though often traversed by crystalline veins, are colored and capable of receiving a polish.

Many of them possess particular names, for example, the black variety is called lucullan (nero antico) from the Roman Consul Lucullus, who valued it highly and first caused it to be brought to Rome (probably from Egypt); that variety from Kilkenny in Ireland, called, also, anthraconitic, encloses shells of a whitish color which, when the marble is cut, present segments of circles. A shelly marble, containing fossil molluscos animals, occurs at Bleyberg in Carinthia; it is called lumachel (from lumaca the snail,) and exhibits beautiful iridescent colors, which are sometimes prismatic, internally, but most commonly of various shades of red and orange whence it has also obtained the name of fire marble. Its colors are attributed to the shells of a variety of nautilus. A variety occurring in France and Spain, composed of varied segments cemented together by limestone, is called breccia marble, or broccatello. The rosso antico from Egypt, and the giallo antico from Macedonia and Sienna, have received their names from their red and yellow colors, and are greatly admired in Italy. Cipollino is a marble known to the ancients and is an impure limestone, zoned with green talc or chlorite. The verd antique is also impure limestone consisting of carbonate of lime imbedded in green serpentine. The Cotham, ruin or landscape marble, found near Bristol (Cotham marble) exhibits, when cut and polished, the appearance of a landscape or ruins: it is of common occurrence in the Val d'Arno near Florence —(Florentine marble). The lake of Como marble, which afforded the mass of materials for the construction of the Duomo at Milan, is large grained and found imbedded in mica slate. The calciphyre felspathique of M. Brogniart is a remarkable compound, consisting of a nearly compact limestone with small crystals of felspar, and thus forming a kind of porphyry with a calcareous base. It occurs at the Col de Bonhomme near Mount Blanc. The slate spar (schiefer spar) in the county of Wicklow in Ireland, in Glen Tilt in Scotland, and in Norway is a thin lamellar variety of calc-spar, often with a shining white pearly lustre and greasy feel.

expenditure of importing German stones. When this matter was submitted for the opinion of the late Chief Engineer Colonel Lawe, he reported that the German stones had always been used in preference to the country stones because the latter are harder and because stone cutters capable of dressing them properly and bringing them to an even surface are not procurable in this country; and because they were found to break under pressure. With all these objections, however, as a good lithographic stone 15×8 in. properly smoothed, might be procured in this country for one Rupee, while a German stone of equal size costs thirty or forty Rupees,—I think that they should be ordered to be used exclusively. If there be difficulty at first with the ink, and perhaps properly speaking every stone, and every climate would require to have ink of a consistence and composition to suit it, a little practice would show what ink would be most adapted for the lithographic limestones of this country.

No. 13. Lithographic limestone from Kulladghee.

CLXXXIII. No. 11. Lithographic limestone from Kulladghee.

No. 36. Blue lithographic limestone from Kurnool.

No. 38. Magnesian lithographic limestone from Kurnool.

CLXXXIX. No. 2. Lithographic limestone from Kurnool.

CLXXXIX. No. 3. Lithographic limestone from Kurnool.

CLXVII. No. 21. Blue lithographic slab from Kurnool.

No. 37. Lithographic limestone from Kurnool.

CLXVII. No. 1b. Lithographic slab composed of silica, iron, lime and magnesia: Kurnool.

CLXVII. No. 1c. Lithographic limestone of Kurnool composed of carbonate of lime, with traces of magnesia, alumina and silica.

No. 1. Lithographic limestone, Kurnool.

CCXIII. No. 2b. Lithographic stone from Kurnool.

CLXVII. No. 2. Magnesian limestone with arborescent ramifications of iron, Kurnool: carbonate of lime, iron (small); alumina (trace), some adhering silica and trace of peroxide of iron, residue in acids.

CLXVII. No. 2a. Magnesian limestone containing aborescent forms of iron from Kurnool.

No. 35. Lithographic limestone from Kurnool.

Nos. 32, 33 and 34 are lithographic slabs from Kurnool.

CCXLII. No. 1. Lithographic marble slab from Juggiapetta.

CLXXXIX. No. 4. Lithographic stone from Juggiapetta.

CCXII. No. 2. Lithographic stone from Juggiapetta.

CCXIII. No. 2. Lithographic stone from Juggiapetta.

CLXXXIX. No. 1. Lithographic stone from Datchapilly.

CCXIII. No. 2. Lithographic stone from Datchapilly.

CCXIII. No. 2a. Lithographic stone from Datchapilly.

I have the honor to be,

Sir,

Your most obedient Servant,

EDWARD BALFOUR, Surgeon,

In charge of the Government Central Museum.

Government Central Museum, College of Fort }
St. George, Madras, 1st January 1854. }

PUBLIC DEPARTMENT.

No. 136.

Extract from the Minutes of Consultation, dated 14th February 1854.

* Read the following letter from the Officer in charge of the Government Central Museum.

Here enter 1st January 1854, No. 77.

1. The Right Honorable the Governor in Council is extremely gratified to find that the Museum has, through the exertions of Mr. Balfour, made such marked progress since the last report.

2. It now contains upwards of 20,000 specimens of which 7,123 were presented during the past year.

3. The public appreciation of this valuable Institution is also shown by the large numbers of Visitors, who are estimated to have amounted to about 26,000 in the last year. For these gratifying results, the Government are indebted to Mr. Balfour, by whose praiseworthy exertions the Institution has attained its present flourishing condition.

4. The Right Honorable the Governor in Council sanctions the Bills, submitted, amounting to Rupees (625-14-6) six hundred and twenty-five, Annas fourteen and Pice six.

(A True Extract.)

H. C. MONTGOMERY,

Chief Secretary.

The marble which brings the highest price, however, is that known as the saccharoid,* or saline, or statuary marble. This and the white lamellary marbles are very similar and they sometimes pass into one another. The value of the white lamellary or the close grained saccharoid marbles consists in their importance to the statuary, the more particularly as most of the ancient statuary marbles are lost, and fine modern statuary marbles are rare. The white marbles of less beautiful texture or the white with greyish or green veins is employed for columns, bases, tables, chimney pieces &c. for all which objects the coloured opaque marbles are also admirably suited. When marble is but of one color, that color should be pure and without mixture; when the marble is of different colors these should be bright and contrasting; and, whether in veins, or spots, or patches, these, to constitute a beautiful marble, must be arranged in a manner agreeable to the eye: but, whether of one color or of several, the susceptibility of taking a fine polish is essential to all kinds of marbles.

The principal quarries of the statuary limestone are those of Pentelicus near Athens; those of Paros; and those of Carrara in the gulf of Genoa. The master piece of ancient Greek sculpture, the Pentelicus at Athens (a work of Phidias) was built of Pentelican marble: the renowned sculptures of Praxiteles, Appollodorus, Cleomenes, and others were likewise executed in the crystalline limestones of Greece, and the glorious creations of Canova and Thorwaldsen were formed out of Carrara marble. The ancient quarries of Pentelicus, where the crystalline limestone forms a vast bed among mica slate, have been re-opened in recent times and the costly material of this stone is the more sought after and used by sculptors because the Carrara marble, now quarried, though of a finer grain and closer texture, frequently contains greyish spots which are offensive to the eye. Even the Pentelican marble is often traversed by greenish and greyish veins. Parian marble, also, is now coming into use again: it is white, large grained, and considerably translucent.

Compact limestones are, perhaps, of all building stones the best. The durability of the stone is, perhaps, best judged of by observing the condition of those parts which have long been exposed to the elements. A good building stone must be sonorous under the hammer, close grained, and of even texture,—it must work with facility and in various directions without splitting and yet be sufficiently compact not to absorb water, and it must be tenacious so as not to be crushed by the weight it will have to bear. Most limestones must be placed in a building in the way they lay in the quarry, but some kinds may be placed in any direction; and these are particularly valuable for columns, lintels &c.

* The name saccharoid has been given from its finely granulated texture.

The stone used in lithography is, also, a compact limestone, and is of so much value in the arts as to merit the attention of geologists. Although stones, suited for taking impressions from, are found in many countries, the best are still brought from Germany which is a cause of their very high price. The discovery of a good variety of lithographic limestone in this country would, therefore, be a matter of importance both to trade and to science, and I give a description of the characters of this limestone to enable enquirers to recognise it.

As these prefatory remarks have already, however, extended to much length, I think it preferable to reserve any observations which I have to make until reporting on the lithographic limestones, in the Central Museum and, without further observations, proceed to describe the marbles of the Madras Presidency and the sites they come from.

To JOSEPH GOOLDEN, Esquire,
Chairman, Chamber of Commerce.

SIR,

I solicit you to draw the attention of each Member of all the Mercantile Houses of Madras, to the First Report on the Central Museum which appeared in the Gazette of last night—and copy of which is enclosed.

It will be observed from that report that I have already collected 16,000 specimens; 10,000 of them being in illustration of Natural History, and the remaining 6,000 have been placed in the Museum of Economic Geology, as they consist of samples of substances applicable to the use or the wants of man. The full development of this Economic branch of the Museum is a point of the greatest importance, and I solicit your Chamber to direct the attention of all the Mercantile Community to it, and to point out to them the immense benefit that this country and this community would derive therefrom.

It has, for many years past, been a subject of just pride to the wealthy Merchants of Holland that, while they were not neglecting their personal interests, they could point out to strangers their scientific Institution, called the Felix Meritis, on the Keisers Gracht of Amsterdam, but it is only lately that any of the Merchants of England have evinced a desire to have samples of the products of the earth collected into one place. They seem now, however, from what the Grand Exhibition showed them, to have become fairly convinced of the necessity for a Central College of Arts and Manufactures, and the Merchants of Bristol, Birmingham, Halifax, Hull, London, Oldham, Sheffield, and the Committee of the Staffordshire Potteries are energetically endeavouring to have such formed. The memorial of the London Merchants, bearing as it does the names of men quite familiar to you all, is the only application from Merchants that I append, but I annex it, here, to place their views before you and in the full hope that your opinion will coincide with theirs, and that you will collectively and individually aid me to carry out the highly liberal and enlightened views which have induced this Government to institute the Madras Central Museum.

When I thus ask your aid to the Institution, I beg to explain that it is not money that is needed, but I wish you all to take an active interest in the progress of the Institution and to send for it samples of all the products of this country which pass through your hands.

Were I to ask money of you, I well know that you would give it in the same princely manner that you bestow it on other public institutions, but money cannot do for the Museum a tithe of what could be effected by your bestowing

A P P E N D I C E S.

MARBLÉS FROM THE WATERSHED OF THE GODAVERY, KISTNAH AND PENNAR RIVERS.

The rough geological maps in the works of Sir John Malcolm, General Cullen, Colonel Sykes, Dr. Benza, Dr. Malcolmson, and Captain Ouchterlony, and the writings of Heyne, Voysey, Kaye and Newbold, have given us that general idea of the prevailing rocks in the greater part of the territories occupied by the Madras Army which is of use to have before undertaking the examination of a district in detail. With these in our possession, however, it has seemed to me that one of those details—which might now be advantageously entered upon is a history of the marbles of this country. Their great value for architectural and sculptural purposes had led to the discovery of many sites by the natives of the country, and the active zeal of contributors to the Museum, has made such as were known before better known, and has led to the discovery of many others some of them of considerable beauty and value.

There are already 239 specimens of marbles in the Central Museum, all products of the South of India and exclusive of a valuable collection of French and Italian marbles which have been obtained for comparison.

The districts from which the greater number of the marbles of Southern India have hitherto been derived, occupy that central tract of the peninsula through which the Godavery, the Kistnah, and the Pennar rivers flow towards the eastern coast. Voysey described these stratified rocks as the blue slate or the clay slate formation, but Malcolmson has called it the argillaceous limestone formation, as better characterising the general structure of the strata, which he considered to be of the same age as the fossiliferous rocks in the northern part of the peninsula. This central part of Southern India has been more examined than any other as Heyne, Voysey, Cullen, Malcolmson and Newbold have all successively written on it; but the most recent description of this limestone district, is by Dr. Malcolmson from whose writings the following account of the countries traversed by the three rivers, the Godavery, the Kistnah and the Pennar has been drawn. Though somewhat long I need only mention as my apology for introducing it that 176 of all the marbles in the Museum, and all our specimens of lithographic stones have been received from the valleys through which these three rivers flow, in the early parts of their course.

The Godavery flows through the basaltic region of the Dekkan, which has been well described by Colonel Sykes; and thence, greatly increased in size, it enters the granitic table land of the Dekkan, and flows at the southern foot of the Sichel mountains into a sandstone and argillaceous limestone country. This district is similar to Bundelcund and Malwa, it also contains diamonds, and has been much broken up by erupted rocks. * * * It enters the plains of the Coromandel coast through a pass in the gneiss mountain of

Papecondah, and, in this district, the sandstone re-appears at an elevation little above the sea, but basaltic hills, several hundred feet in height, in which marine fossils have recently been discovered, exist almost within the delta formed by its sediments. In addition to various fossiliferous limestones, from the vicinity of Rajahmundry one specimen of the limestone rocks from near Elgundel has been received in the Museum. It is a hard, compact marble suited for all architectural purposes and will be noticed hereafter.

South from the Godavery, we meet the Kistnah, flowing through the territories of the Southern Mahrattas, a country covered with a rich basaltic soil and abounding in schistose limestone, sandstone, granitic rocks and basalt, and it then enters the granitic platform of the dekkán; on descending the river, however, the limestones and sandstones, soon re-appear, and extend across to the basin of the Pennar, and as far as the ascent to the granite platform of Mysore. It is on the banks of the Kistnah that the richest diamond mines occur and that the sandstones acquire their greatest elevation, amounting to more than three thousand feet: the river, after passing through precipices of this rock and of the schistose limestones to be presently described, enters the plains of the Carnatic where the same rocks occur, sometimes a little elevated above the level of the sea,—at others forming caps of granitic mountains, or broken up by varieties of greenstone and basalt. Thence, passing through a narrow gorge in the gneiss hills of Bezwarah, it enters the alluvial plains of the Carnatic continuous with the delta of the Godavery. It is from this great tract of country that our richest supply of marbles has been received; one portion from around Kulladghee and Bagracottah in the doab of the Gutpurba and Malpurba, another from the vicinity of Kurnool on the right bank of the Tumboodra, and, further eastwards, at Datchapilly in the Guntoor Collectorate, and at Juggiapettah in Masulipatam, near the Kistnah, after it escapes through the pass at Bezwarah into the plains on the sea coast.

The last of the three rivers in that central district is the Pennar. It is comparatively a small stream, but of much geological interest, the greater part of its waters being derived from the districts in which the diamond sandstone and the argillaceous limestones on which they rest are exhibited in their most characteristic forms, and where they are most easily investigated. Like all the rivers of Southern India, granite is frequently seen in its bed, more especially in its southern branches, where the passes of Ryachottee lead to the granitic table land of Mysore. With these exceptions and the occasional appearance of trap through the stratified rocks, its course, after emerging from the gorge in the Nalla Mulla range into the Carnatic is over rich plains of black and saline alluvium till near its mouth, when it flows through low hills of laterite, and in the vicinity of Nellore, but little elevated above the sea, sandstones and argillaceous limestones are said to occur and to be continuous with the same rocks on each side of the Kistnah.

on its wants a little of your time and attention in reflecting how best to promote its success, and I ask of you all to lend the Government a willing hand in their efforts to develop the resources of this country, and do good to all by making various known products still better known and bringing into use others which have not hitherto been applied to the wants of man.

With one exception my former applications to you all have not met with any attention, and I attribute this inactivity on your parts to a diffident feeling that you cannot send any samples deserving of being kept,—but I would beg of you to run over the names of the contributors who, in the past 12 months, have sent 4,658 specimens to the Museum, and you will be conscious that your opportunities of giving assistance greatly surpass those of the past years. Donors, liberal as many of them have been. As it is always advantageous, however, to submit a definite scheme, I would propose that the Merchants of Madras collect and present to the Museum, to form a Trade Department in it, specimens of all the products of this and the neighbouring countries which pass through their hands and form articles of trade with this place.

I have the honor to be, &c.,

(Signed) EDWARD BALFOUR, SURGEON,

In charge of the Government Central Museum.

Government Central Museum, College of Fort }
St. George, Madras, 23d February 1853. }

APPENDIX I.

Copy of Memorial from London Merchants, &c. on the formation of a Museum of the Natural productions of all Countries in the City of London.

TO THE EXECUTIVE COMMITTEE OF THE EXHIBITION OF THE INDUSTRY
OF ALL NATIONS.

London, October 10th, 1851.

GENTLEMEN,

Understanding that Her Majesty's Commissioners propose forming a collection of the Raw Produce of different countries, shown in the Great Exhibition, we beg leave to express our conviction of the high practical value of this plan.

We anticipate great benefits to Merchants, Manufacturers, and Brokers from the formation of a great trade museum or collection, of which this would be the foundation, and in which specimens of the natural productions or exports of all countries should be deposited, together with such accurate, scientific, practical, and commercial information as can be procured.

Such a Museum would at all times give the most valuable aid to the mercantile community, and afford that information which is so constantly required, and which there is now no means of obtaining.

We would beg to suggest that, in order to render such a collection really available for trade purposes, it should be formed in the City of London, and so situated as to be conveniently accessible to those who want to refer it.

We have the honor to be,

Gentlemen,

Your Obedient Servants,

THOMSON HANKEY, Jun.

JOHN G. HUBBARD,

J. H. PELLY,

WILLIAM COTTON,

J. B. HEATH,

H. J. PRESCOTT,

R. W. CRAWFORD,

H. W. BLAKE,

JAMES MORRIS,

J. MASTERMAN,

MORRIS, PREVOST and Co.

JOHN CHAPMAN and Co.

OVEREND, GURNEY and Co.

DURANT and Co.

GEO. CARR GLYN,

FORSTER and SMITH,

On behalf of the Committee for managing the affairs of Lloyd's,

JOHN ROBINSON, *Pro-Chairman.*

On behalf of Lloyd's Register, of British and Foreign Shipping,

THOMAS CHAPMAN, *Chairman.*

(True copy.)

(Signed) EDWARD BALFOUR, ASSISTANT SURGEON,
In charge of the Government Central Museum.

(True copy.)

EDWARD BALFOUR, SURGEON.

D.

No. 151.

TO SIR H. C. MONTGOMERY, BART.

Chief Secretary to Government, Fort Saint George.

SIR,

I solicit the Right Honorable the Governor in Council to bring to the notice of the Honorable the Court of Directors, the existence of many duplicates amongst the rock and mineral specimens in the section of the Madras

In the district watered by the Pennar the summits of many of the ranges of hills are horizontal: the continuity of their strata can be distinctly traced from one hill to another, although extensive plains intervene; while, at no great distance, the sandstone which forms the summits of these hills is seen on the same level as the surrounding plains. Numerous instances, also, occur in which the original continuity of the horizontal summits is easily traced; the strata on the opposite and nearly perpendicular sides of a valley being similar, but, having a considerable dip, the beds descend to the general level of the country. The summits of the hills, which are reached with much difficulty, consist of sandstone perfectly horizontal, and divided into huge tables by perpendicular partings, sometimes separated several feet from each other, and filled with broken pieces of the rock. This jointed structure is common to the sandstone; to the schistose beds, on which it for the most part immediately reposes, and to the stratified limestone into which these schists pass insensibly; but the size of the tables so formed, varies from rhombs of a few inches, in the schist and lower part of the sandstone, to enormous masses on the summits of the hills.

The sandstone exhibits many varieties of grain, colour, and hardness: in some places it is white or red, and can be cut into pillars and slabs of great size and beauty; in others it is soft and friable, and its inferior beds are not unfrequently schistose, so as to be with difficulty distinguished from the subjacent rock, with which it has in one or two places been observed to alternate. Where the sandstone approaches the great granitic tracts to the south and west, it passes into a compact quartzose rock, as is seen on both sides of the Tripatty Valley. This passage is also observed in other places, as near the Cuddapah diamond mines, where the plentiful occurrence of basaltic pebbles shows the neighbourhood of the trap. The sandstone always rests conformably on the schists, although from its jointed structure it occasionally, when elevated, appears to meet the subjacent rock at a more or less obtuse angle.

The schists on which the sandstone rests, vary very remarkably in colour, being in different places blue, red, green, or pure white, in which they seem to bear some relation to the incumbent sandstone. They are also occasionally flinty or jaspideous—sometimes they are wanting, the sandstone resting directly on the limestone, of which the schists are evidently merely the upper beds, and into which they pass insensibly, although it seldom happens that considerable effervescence does not occur on examination by tests. It is in many places impossible to say to which portion of the series any particular specimen belongs.

The limestone is a compact rock, but the strata are usually thin, and are often intersected by vertical partings, a circumstance which frequently limits its use in ornamental architecture. Its most common colour is a light blue passing into black but it occasionally occurs of a nearly pure white, and

affords an admirable material for basso-relievos. On this stone the finest sculptures of the ruined city of Amrawaty are executed, and for delicacy of workmanship they have, perhaps, never been surpassed. Were it not for the occurrence of small crystals of quartz, the same quarries would furnish an excellent lithographic stone. Near Cuddapah the dark variety is the common building stone, and many fine columns, caryatides, and cisterns are composed of it. The stone is applied to the same objects in the Southern Mahratta country, and along the course of the Godavery towards Nagpoor.

To the south and east of Cuddapah, a narrow valley, nearly 150 miles in length, extends through the limestone, the strata of which are in some places nearly vertical, but form rounded hills. In others they are capped by sandstone, which exhibits mural precipices of much grandeur, and almost or entirely inaccessible. The strata, for the most part, dip to the N. W., resting on the granite of the Carnatic. This rock is penetrated by many dikes of greenstone, which have evidently been instrumental in elevating the stratified rocks to their present singular positions. Little has yet been ascertained regarding the thickness of these strata, which differ much even in the same range of hills. From the country drained by the Pennar many beautiful marbles have been received; those with various shades of green, so well known as Ghootty marbles, have long been famed, but the Museum is rich in specimens, from that neighbourhood, of a variety of colors, most of them collected in former years, by General Cullen in the vicinity of Chellumcoor, Ryalcherroo, Tarputry and Cuddapah.

With this sketch of the general appearance of the districts drained by the Godavery, Tumboodra, Kistnah, and Pennar, I will now proceed to describe the specimens of their marbles which the Museum contains, but the value of some of them, for purposes of sculpture may be ascertained by making an examination of the collection of basso-relievos lying in front of the Museum which Mr. Walter Elliot brought to Madras from Amrawaty about 14 years ago. Some of them, indeed, seem to have attracted attention at home for amongst several hundred mineral substances which were transmitted from the Madras

Committee to the Exhibition of 1851 were several marbles* and the following notice was taken of them, in the Juries report.

"From India are sent many specimens partly manufactured, indicating the existence in that country of valuable

- *149 and 150. Greyish-white and yellowish-white marbles (granular), from Cuddapah.
- 151. Yellow marble, from Gooty Hills.
- 152 and 155. Green, pink, grey, and lavender-colored marbles, from Cuddapah.
- 153 and 154. Purplish-colored, wax-colored, and bluish-grey marbles, from Ceded Districts.
- 150. Grey and yellow marble, from Ryalcherroo near Cuddapah.
- 160. Black marble, from Tarputry.
- 165 and 166. Dolomite, or magnesian limestone, from Travancore and Rajahmundry.
- 208. Slaty marble, from the Tumboodra.

Central Museum, which I have designated the Department of Geographical or District Geology, from which, if deemed advisable, the Museum at the India House might be usefully enlarged by forming in the Home Museum a similar department of Geographical or District Geology containing specimens from the rocks of the various districts and Military divisions of the Madras Presidency.

The commencement and introduction into this country of Railways, as well as other large Engineering and Architectural undertakings, seems to render it a matter of much importance that there should be at Home, for the convenience of those interested, samples of the natural products of the districts in which such are to be constructed, and I know of no plan by which facilities of reference could be more easily afforded than by the establishment of a department in the Home Museum, such as I have here suggested the introduction of.

It is however necessary to remark that though I have already collected, in the past 18 months, 3,260 specimens into this Geographical Department of the Madras Central Museum, it looks as if an additional 12,000 specimens, must still be collected before the Geology of the districts of the Madras Presidency can be fairly exhibited, as it will be observed that there are still 27 out of the 40 Collectorates and Military Divisions* almost or even wholly unrepresented.

Names of the Districts and number of specimens in each District in the department of District or Geographical Geology in the Madras Central Museum.

Name of District.	Number of Specimens	Name of District.	Number of Specimens
Aden	185	* Nellgherries	46
* Arcot Northern Division	160	* Nellore	124
* Arcot Southern Division		* Nuggur country	12
Bellary	510	Nagpore	200
* Canara	70	* Pegu and Burmah	73
Chingleput	310	Rajahmundry	125
Coimbatore	27	* Syria	33
* Cuddapah	19	* Saugor and Nerbudda Territories	118
* Ganjam	22	* Salem	42
* Gooty	30	* Singapore	10
* Guntoor	24	* Southern Mahratta country	
* Hyderabad country	174	* Tanjore	24
* Karnool	11	* Tavoy	17
* Malabar		* Tinnevelly	3
* Masulipatam	90	* Trichinopoly	
Madura	164	* Turkish Arabia	10
Madras	38	Vizagapatam	
* Malacca		Vizianagram Zemindary	161
* Moulmein	112		
* Mergui			
Mysore	302		
		Total ..	3,260

The Honorable Court are aware of the existence at Chatham of an extensive Museum formed by the labors of the Medical Officers of the British Army and that, from time to time, Officers, whose tastes are in that way, are selected to do duty there from among those who are on leave at home, and if it should

be the Honorable Court's wish to increase the Home Museum to an extent commensurate with the magnitude of their Eastern Empire, I venture to suggest that specimens be sent from home from the Madras, Bengal, and Bombay Museums, and that a similar selection might be made from their Officers at home on leave, amongst whom there are always several well suited for taking charge of a Museum, and all of whom, if such were desirable, would, I feel assured, be very glad to do so, even without any increase of pay.

I have the honor to be, &c.

(Signed) EDWARD BALFOUR, SURGEON,

In charge of the Government Central Museum.

(True copy)

EDWARD BALFOUR, SURGEON.

Government Central Museum, College of Fort St. }
George, Madras, 27th April 1853. }

APPENDIX B.

General List of the Contributions, &c. received for the Government Central Museum from the month of July to December 1853.

	Number of specimens.
Purchased ..	649
Donor's Names.	
Agnew, J. Vans Esq., Madras	1
Asprey, Serjeant W., Jailor, Guindy	1
Aubert, Mr. John, Madras	2
Balfour, Edward Surgeon, Madras	64
Bell, T. L. Esq. Surgeon, Nizam's Army	1
Biden, Captain, Madras	1
Bird, C. J. Esq., Collector of Tinnevelly	446
Bird, J. Esq., Collector of Trichinopoly	3
Blundell, E. A. Esq., the Honorable, Officiating Governor of Malacca ..	4
Brown, A. E. Esq., Tuticorin	10
Burgass, Rd. Esq., Sheriff of Madras ..	1
Campbell, Captain 50th Regiment	1
Campbell, C. B. Colonel	11
Carpendale, J. Esq. Engineer, Promé	27
Clarke, G. W. Esq., Guntoor	4
Collyer, Captain Engineer, Chittoor	28
Conway, T. B. Esq., Kurnool	2

"material more or less resembling our marbles, and suitable for similar purposes. A few of these are colored, and the quality of the white marble is very peculiar. One of the colored kinds may be mentioned, as affording a tint of a pale green unknown in Europe. This is from Bellary (Madras P. 868) and is a magnesian rock probably a variety of serpentine" (vide Juries Report P. 562). This favorable report from the jury of the Great Exhibition may perhaps draw attention to these green marbles, which are the first that I shall describe.

CEDED DISTRICTS

MARBLES OF BELLARY, GHOOTY, CUDDAPAH, KURNOOL AND SOUTHERN MAHRATTA COUNTRY.

No. 1 to 17 are Magnesian Limestones, massive marbles of a variety of colors varying from cream yellow to a leek green color. These rocks are generally known in the Ceded Districts as Ghooty marbles,—owing to their chief locality being the neighbourhood of that fortress,—although they are not limited to that spot, being found at and south of Ryalcherroo and in some parts of the Southern Mahratta country. Some of the greenish colored specimens, here, are pleasingly waved with various shades of a darker green and others have arborescent forms on their surface. This rock is susceptible of a very fine polish and is suited for building and ornamental purposes. The specimens Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 are in the Museum of Economic Geology: of these No. 3 (88) is marked as having been obtained to the eastward and southward of Venganapully; No. 15 as "some miles south of Ryalcherroo"—No. 16 "near Ryalcherroo" and No. 17 as "from Cuddapah."

These (Nos. 1, 2, 6, 8, 9, 10, 11, 12, 13, and 14) are marbles well known to the stone cutters of the Ceded Districts: they seem to be very abundant, being spread over a tract westward from Cuddapah and about Kulladghee, and from their beauty and applicability to ornamental and useful purposes, are deserving attention. Most of these specimens have been contributed by Lieutenant General Cullen, T. L. Strange, Esq. and Colonel Tulloch, C. B. and Captain Roberts of the Engineers has just presented some very valuable specimens described below.

No. 24 is a compact limestone, found 2 miles east of Chillumcoor in the Cuddapah district. It is of a deep, obsidian black color, and polished, and I think that it would be admired as a black marble. There are faint streaks of an ochre yellow just distinguishable on its surface which relieve the general blackness of the marble, these striæ are probably occasioned by particles of iron, and, if so, such a rock, if exposed to the weather, might decay, but it might be admired for building and ornamental purposes within doors. These very black limestones are very abundant in the Madras Presidency and several specimens from Woontamitta and near Kurcumbady will be observed amongst the limestone group of rocks in the geological department. They would answer well as a paving material, and being of a marked slaty texture, could readily be quarried. Indeed, all the compact and crystalline limestones of this country of which there are an immense variety extending from Nagerum westward towards Goa and northwards to the Kistnah, and the Godavary along the Northern Circars are deserving of attention.

Number of Specimens.

Cotton, Colonel Chief Engineer, Madras	1
Callen, W. Lieut. General, Resident at Travancore and Cochin	132
Cumming, G. V. Superintending Surgeon, Northern Division, Waltair	68
Davidson, R. W. Esq., Ceylon	266
DeLafoye, Madame, Pondicherry	1
Deschamps, E. Esq., Cabinet Maker Mount Road	16
Elliot, W. Esq., Vizagapatam	4
Fisher, Mr. J., Madras	1
Geddes, J. L. Esq., Superintending Surgeon Hyderabad Subsidiary Force	33
Gubbins, Charles Esq., Collector of Bijnore	120
Hakeem Syed Mahomed Sahib, Madras	2
Haly, G. T. Captain, Ganjam	2
Hamilton, Sir R. N. C., Indoor	150
Hilbers, W. Assistant Surgeon, Madras	1
Hislop, S. Reverend, Nagpore	58
Horsley, Captain, Engineer, Tinnevely	8
Hunt, P. R. Esq., Madras	2
Hunter, A. Assistant Surgeon M. D., Madras	47
Jerdon, T. C. Dr., Nagpore	96
Kennedy, J. Dr. M. D., Madras	21
Kirkpatrick, J. Dr. M. D., Mysore	7
Lawder, J. Captain, Madras	1
Leslie, W. A. Dr. M. D., Zillah Surgeon Honore	3
Loudon, J. Captain, Hoonsoor	4
Lovell, J. Surgeon, Bejapore	2
Ludlow, S. O. E. Captain, Acting Civil Engineer 7th Division Cannanore	1
Maltby, E. Esq., Cuddalore	56
Muzzy, C. F. Reverend, Madura	340
Ogilvie, R. Captain, Masulipatam	133
Orr, A. Captain, Civil Engineer Kistnah Division	42
Ouchterlony, J. Esq., Madras	1
Parthasaradiah, V. Secretary Patchapah's School	1

Pearse, J. L. Captain, Mysore Commission	1
Roberts, R. A. Captain, Superintendent, Munzerabad Ghaut, Mysore	25
Roberts, G. B. Captain, Madras	252
Robertson, W. Esq., Master Attendant, Tuticorin	37
Rohde, J. Esq., Guntoor	93
Rungasawmy, P. Moodelliar	9
Scott, Dr. A. M. D.	1
Sherman, J. W. Esq., Physician General, Madras	3
Smart, G. Captain 21st Regiment Madras Native Infantry, Penang	78
Smith, J. O. Bombardier 2d Troop Horse Artillery, Poona	9
Taylor, C. E. Captain 35th Regiment Native Infantry	1
Thomas, E. B. Esq., Collector of Coimbatore	62
Traill, W. Dr. M. D., Singapore	15
Tweedie, A. L. Captain, Assistant Chief Engineer, Rajahmundry	34
Wood, Henry Esq., Asst. Collector of Arcot, Southern Division	3

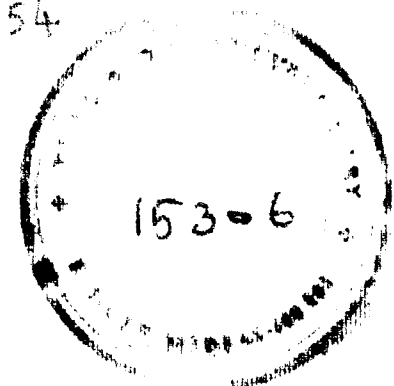
Total 3499

EDWARD BALFOUR, SURGEON,

*In charge of the Govt. Central Museum.*Government Central Museum: College of }
Fort St. George, Madras, 1st January 1854. }

NA 211,6

M54



No. 22, in the Economic Museum, is also from near Chillumcoor. It is of a dark ash grey color, with mottled streaks on its surface, which is finely polished. This rock is very fine grained and hard but the hand-specimen in the Museum is too small to admit of its other capabilities being alluded to. A stone mason who examined it says it is a good marble.

No. 23 in the same department, is a fine grained crystalline limestone from Cuddapah of a reddish color. This hand-specimen has been struck off at the surface of the ground and is somewhat weathered, but it has been roughly polished and I think that its color would be admired. It would answer for ornamental purposes.

No. 25, is a very finely grained marble of a pale leek color, and would take a good polish. It is from Ryalcherroo near Ghooty, but the hand-specimen in the Museum is too small to give an opinion from regarding its capabilities.

No. 26 is a dark ash grey marble, prettily marked by wavy irregular lines of a darker grey:—it has a very good polish on it and seems a smooth, easily worked rock: it is obtainable 12 or 13 miles east of Ghooty and is suited for ornamental and building purposes.

No. 27, is a likewise from Ryalcherroo, and is a hard, ash grey marble, with a splintery appearance and does not promise to be a good working material: the hand-specimen here has evidently, however, been struck off at the surface of the earth and is not well suited for forming an opinion from, as to its applicability to economic purposes.

No. 16. Among the minerals is a serpentine marble sent by General Callen from near Ryalcherroo: it is a dark green rock, of value as an ornamental marble. M.

No. 1. Among the Ghooty rocks in the Collectorate specimens, is a dark ash grey marble suited for building.

No. 1a. Marble of Ghooty is a magnesian limestone, crystalline and similar to the Ghooty marbles.

No. 4. Is a greenish grey, but finely crystalline limestone, from Ghooty, suitable for building and ornamental purposes. D.

No. 14. Is a greenish crystalline limestone from Ghooty, of a slaty structure suited for paving. D.

No. 21. Marble of Ghooty, magnesian limestone, is similar to the other Ghooty marbles.

No. 88. Lithographic limestone procurable to the eastward and southward of Venganapilly, Bellary; it is one of the "Ghooty" marbles.

No. 28, is a white crystalline dolomitic marble marked from "Hills near Bellary"—it appears to be a marble that the statuary would value, but

the specimen is very small. I have not been able to trace this rock's locality but imagine that the hills alluded to must be near Soondoor, though this is a mere conjecture. It is a valuable marble.

Nos. 20 and 21. Among the Bellary rocks, are 2 slabs of yellowish colored crystalline limestone, from Bellary, presented by Colonel A. Tulloch, C. B., suited for bone stones, building and lithography. D.

Nos. 22 and 23 also from Bellary, are greenish colored marbles,—No. 22 being prettily spotted with darker green and No. 23 being marked with waves of a darker green: suited for ornamental and building purposes. D.

No. 24, is a blue limestone from Bellary. D.

No. 36. Is a crystalline slaty limestone of a greenish color from a hill near Koonahagagarah, twelve miles north from Bellary,—suited for paving.

Nos. 2, 9, 23 and 69, in the rocks from the Ghooty Sub Collectorate, and all marked from Ghooty, are the same as the above No. 23 being of a deep leek green. D.

No. 30 from the Bellary Collectorate, found at Yettanuttu and Goura-pooram in the Soondoor country is likewise similar to the above. D.

No. 29 from the Bellary Collectorate is a crystalline limestone of a leek green color, from a hill near Sandgeerah 15 miles north of Bellary. D.

Nos. 22 and 23, are wavy apple green limestones from Bellary and are similar to the above.

No. 659. Amongst the limestones of the geological department, is of the same character. D. G.

No. 2a, is a slab of serpentine marble, from Zorapore near Kurnool, well suited for ornamental purposes. It is scarce, and is employed by the people as dagger-hilts.

No. 17, is also serpentine marble sent by Captain Russell from Zorapore near Kurnool, where it occurs in small quantities. It is a more pleasing variety of this rock than the specimen last named and might be used for any ornamental purposes marble is turned to. Captain Russell reports it as not abundant and says that the people of the district prize it for dagger-hilts. M.

No. 24. Compact limestone assuming a crystalline appearance with iron pyrites from Kurnool.

Nos. 24 and 44 are compact marbles very abundant at Kurnool in the Ceded Districts many specimens of which have been sent by Captain Russell, the Assistant Commissioner there. From their abundance in that province, they are made use of by the people as a building material for which they are admirably adapted. They have also as well in former years as recently been used as lithographic stones and found to give a clear sharp impression.

There are many specimens of these limestones in the Museum, the colors varying from a bluish grey to a buff yellow and they are suited for building, paving and lithographing, for all of which purposes they have been and are in use.

CLXXVIII. No. 1. Lithographic slab of clay slate from Kulladghee.

CLXXVIII. No. 2. Lithographic slab from Kulladghee.

CCXXXVIII. No. 4. Limestone compact from Koonthathaula Kulladghee.

No. 13, is a greenish white crystalline marble from Southern Mahratta country, suited for ornamental purposes. M.

No. 17. A coarse greenish marble from Gotopolah, suited for building purposes.

No. 37. Compact white marble from Southern Mahratta country suited for statuary purposes. M.

CCXXXVIII. No. 29. Is a faintly reddish grey marble from Kulladghee. It is somewhat coarse but well suited for building.

CCXXXVIII. No. 30. Limestone from Yathawada, Kulladghee, and, as a marble, has similar qualities to No. 29.

No. 31. Variety of whitish marble from Southern Mahratta country—applicable for purposes of statuary, similar to No. 35. It is a valuable marble.

CCXXXVIII. No. 32. Limestone marble, of a reddish grey color, from Chenthraghee, Kulladghee.

No. 33. Is a pale flesh colored limestone, finely crystalline, from Bagulcottah, Southern Mahratta country.

No. 34. Is a pale flesh colored limestone finely crystalline from Koonthathaula near Kulladghee.

No. 35. Is a whitish crystalline marble from the Southern Mahratta country similar to No. 31 which see.

No. 36. Is a striped pale green marble from Bagulcottah in the Southern Mahratta country, similar in character to the greenish colored Ghooty marble.

No. 247. A fine homogenous, greenish brown, lithographic marble from Talicotah which was "tried at the depot of Institution by Major (now Colonel) Blundell, C. B. and found to answer well for purposes of lithography."

Before concluding the printing of the marbles of the Bellary and Cuddapah District, I would add a description of the following very beautiful

marbles just received from Captain Roberts of the Engineers collected between Curcumbarry and Ghooty. They are all very beautiful.

No. 1. Compact, bluish black, limestone with crystals of——? found near Tadpurte: suited for building and architectural purposes.

No. 2. Dark, almost black, compact limestone called nulla rai, i.e. black stone, found in the bed of the Pegeroo River, in the Camalapoor Talook of the Cuddapah District: suited for ornamental and building purposes.

No. 3. Dark, almost black, compact limestone called nulla rai or black stone, found in the bed of a Nulla near Cuddapah; suited for ornamental and building purposes.

No. 4. Pale greenish colored magnesian limestone, found in the vicinity of Ryalcheroo on a hill near the boundary of the Cuddapah and Bellary Districts; suited for ornamental purposes.

No. 5. Pale, greenish colored, compact magnesian limestone with veins of blue; same locality as No. 4, suited for ornamental purposes.

No. 6. Deep green colored, compact, magnesian limestone veined with blue; same locality, suited for architectural purposes.

No. 7. Greenish white and cream white, compact limestone; same locality, suited for ornamental purposes.

No. 8. Greenish white and yellowish white compact limestone, with streaks of a dark blackish color, highly ornamental; same locality.

No. 9, 10, 11, 12 and 13. Compact limestones of deep leek green color and mottled with veins of green, some of the specimens assuming a finely crystalline structure: suited for ornamental and building purposes; from Ryalcheroo.

No. 14. A grey compact limestone with serpentine like points of a greener color, highly ornamental; found in the vicinity of Ryalcheroo, on a hill near the boundary of the Cuddapah and Bellary Districts.

No. 15. Coarsely crystalline earthy limestone, of a reddish brown color, suited for building purposes; from Ryalcheroo.

No. 16. Soft limestone of a reddish brown color—suited for making lime; from Ryalcheroo.

No. 17. Saccharoid marble of a faintly greenish tinge, suited for statuary purposes; from Ryalcheroo.

GUNTOOR MARBLES.

In tracing these rivers further to the Eastward, into the Guntoor Collectorate, we find several of its Talooks rich in marbles which seem deserving of attention. Amongst those that have been received, two colors principally prevail, a pale white with a faint tinge of blue or grey, and a deep black color, approaching almost to the blackness of Lucullan marble, but other colours are not unknown, the prettiest being a white with wavy veins of red. The Pulnaud and the Datchapilly and Innacondah Talooks seem to be the principal marble districts in the Guntoor Collectorate but the Innacondah Talook far exceeds the Pulnaud in the variety and beauty of its marbles. Behind Innacondah is a range of prettily rounded hills, the strata of which are marked by the continuous wavy lines of varied vegetation.

The rock crops out in several places, and the limited wants of the very few builders in stone are supplied from the surface; no quarry, properly speaking, has ever been opened, in Innacondah, and the people prefer the laminar slaty marbles which separate readily into flags. These are the most abundant, and their naturally flat, smooth, surfaces afford facilities for building. The massive compact marbles are but little esteemed by the people there. The marble of Datchapilly is said to be more splintery and to work less readily in various directions, and the stone near Korampoody is very similar. The other qualities of these marbles, the cost of working and facilities for transport will be found described with each specimen. It is to Mr. Rohde that the Museum is indebted for nearly all the marbles of Guntoor.

No. 2, among the rocks sent by Mr. Rohde, from Guntoor, is a coarse, reddish grey marble from Anoopoolen. It is a surface specimen, but the rock is reported to be spread over an extensive tract: some specimens fret edged tools well.

Nos. 8, 9, 10, and 11 are white, finely crystalline marbles, with a faintly blue tint, and are well deserving attention as ornamental and building materials: they were procured behind the village of Datchapilly, where there is a very extensive bed.

Nos. 12 and 13 are specimens of very hard black marble from near Pondigul, where slabs, 2 feet long and 1 broad, are procurable. It is disfigured by faintly reddish points but it is suited for building purposes.

No. 17. Is from the same place and of the same texture and color.

No. 14. 1 A. Is an ash grey marble, finely crystalline and of a pleasing color and is supposed to have been found in the Pulnaud. It has, however, the word "Datchapilly" marked on it; useful for building purposes.

No. 15. 2 A. Is a pleasingly variegated, leek green marble supposed to be, like the last, from the Pulnaud, though it, too, has the word Datchapilly on it. It is useful for ornamental purposes.

No. 16. 3 A. Is a reddish white, but somewhat coarsely granular marble with "Datchapilly 3 A" marked on it. It is understood to be from the Pulnaud; useful for building and ornamental purposes.

No. 18 D 1. Marked Dyda, is a liver colored, finely crystalline, marble, understood to be from the Pulnaud; useful for ornamental purposes.

Nos. 36 and 38 are, like the above, sent by Mr. Rohde of Guntoor, they are finely crystalline, black colored, marbles, well suited for ornamental and building purposes.

Nos. 21 and 22 are specimens of clay slate from Dyda and Tailgooutala about 4 miles from the Kistnah: these slates are procurable of any size with great facility: slabs 7 feet by 3 and 2 inches thick, cost 8 annas; there is, however, no water carriage; they are well adapted for pavement and other purposes.

Nos. 23 and 24 are slabs of somewhat coarse crystalline marble from Re-goolagadda near Pondigul: the land carriage is by coolies for 8 miles—they are well adapted for building purposes.

Nos. 25 and 26 are unpolished marble mortars evidently manufactured from the same marble as specimen No. 14.

No. 109 is a compact marble of dense black color known as Pondigul slate and sent in large quantities to Hyderabad. Presented by Mr. J. S. Stricke.

DATCHAPILLY TALOOK.

Nos. 50, 51, 52, 53, 54, 55, 56, and 57 are crystalline limestones from Datchapilly.

No. 50, being finely crystalline and greyish white, suited for statuary.

No. 51, finely crystalline and reddish white, suited for statuary.

No. 52, Rather coarsely crystalline, reddish grey; suited for building.

No. 53, Leek green, finely crystalline, suited for building.

Nos. 54, 55, 56, and 57 bluish grey and similar to the Kurnool stones. These have been tried and found to answer well as lithographic stones.

No. 5, Marble from Datchapilly, suited for lithographic and building purposes.

No. 8, is a variegated greenish white marble from Datchapilly, suited for statuary purposes.

No. 2, Compact marble, black, discovered on the east side of the village of Macherla, in the Timmerekota Talook, at the distance of a mile, at the depth of 1 or 2 yards beneath black soil, limestones 1 yard broad, 2 yards long, and 3 fingers thick can be found there. This is suited for architectural and sculptural purposes.

No. 5. Variegated, pink colored, compact marble, from Datchapilly, suited for architectural and sculptural purposes.

No. 7. Greenish grey crystalline marble, found in large slabs say $12 \times 1\frac{1}{2} \times \frac{1}{2}$ feet, North of the ridge of white stone W. of Kondramutta 4 miles; is suited for architectural and sculptural purposes.

No. 8. Variegated, rose colored marble, from the South of the village of Karampoodi. Is suited for architectural and sculptural purposes.

No. 9. Greenish grey compact marble, from Datchapilly, suited for architectural and sculptural purposes.

No. 10. Laminar greenish grey, compact marble, from Regoolagudda, 4 miles N. of Datchapilly, slabs of this thickness and upwards and from 1 foot 8 inches to 5 feet 15 inches are abundant. Is suited for architectural and sculptural purposes.

No. 18. Finely crystalline greyish black marble, from Karampoody village: this rock is bare to a great extent. It flakes off with violent blows but not in regular slabs.

No. 19. Laminar, finely crystalline, greyish black marble, found on the east side of Vamavarum, a village in the Datchapilly Talook, at the distance of a mile and at a depth of 2 yards. Slabs can be found of 4 or 5 cubits in length, 1 or 2 cubits in breadth and 4 or 6 fingers thick. Is suited for architectural and sculptural purposes.

No. 20. White, veined marble, found south of Karampoody, cropping out and generally bare of soil suited for architectural and sculptural purposes.

No. 22. Laminar ash grey compact marble, discovered on the N. E. side of the village of Regoolagudda, in the Datchapilly Talook, at a distance of a mile and at a depth of 1 yard. In this place stones one yard long, half a yard broad, and 3 inches thick can be got, suited for architectural purposes.

No. 27. Laminar, brownish grey, limestone, from the E. side of Vamavarum a village in the Datchapilly Talook at a distance of a mile and at a depth of 2 yards. There can be found stones, here, of 4 or 5 cubits in length, 1 or 2 cubits in breadth, 4 or 6 fingers thick, suited for building purposes.

No. 28. Lamellar compact black marble, found on the W. side of the village Dooggee, in the Timmerecoota Talook, at a distance of half mile in Bundla Vaugoo or Nalla, the stones are visible but unless the ground is dug a cubit in depth they cannot be taken out, these stones cannot be found square, but will be 1 or 2 cubits long one side being thick and the other thin: suited for architectural purposes.

No. 33. Veined finely crystalline, rose colored marble, from Datchapilly; suited for architectural and sculptural purposes.

No. 36. Laminar black marble, discovered on the north side of the village Palapully in the Timmerecoota Talook and can be got one or two yards in size; suited for building purposes.

No. 39. Laminar greyish black marble, found in the red soil on the N. E. side of the village, in the Datchapilly Talook, at a distance of half a mile, at the depth of a yard. There can be found 4 or 5 black limestones in each quarry 2 cubits long, 1 cubit broad and 2 or 3 fingers thick—suited for building purposes.

No. 42. Laminar greyish black marble, found on the north side of Palapully, a village in the Timmerecoota Talook, this stone will be found in the place at a depth of 1 or 2 yards; suited for building purposes.

CLXXXIX. No. 4. Grey marble with a faintly blue tint, from Juggiapettah, —useful for ornamental and building purposes.

No. 30. A slab of bluish grey marble from Juggiapettah, highly crystalline, suited for building purposes.

CCXLII. No. 1. Slab of finely crystalline limestone from Juggiapettah suited for lithographic, ornamental and building purposes.

No. 2. Lithographic stone from Juggiapettah.

No. 1. Is a crystalline yellow marble somewhat resembling the marble of Sienna but of coarse crystals, suited for architectural purposes from Juggiapettah.

No. 2, is a pale green, compact, limestone, suited for architectural and ornamental purposes, from Juggiapettah.

No. 3, is a whitish grey, coarsely crystalline marble, of a laminar texture suited for architectural purposes, from Juggiapettah.

No. 4, is a bluish grey, crystalline marble of uniform color and laminar texture, suited for architectural purposes, from Juggiapettah.

No. 5, is a bluish ash grey crystalline limestone of a laminar texture, suited for architectural purposes, from Juggiapettah.

No. 6, is a bluish grey compact limestone, suited for architectural purposes, from Juggiapettah.

No. 7, is a bluish ash grey crystalline limestone, of a laminar texture, suited for architectural purposes, from Juggiapettah.

No. 8, is a bluish ash grey crystalline marble of a laminar texture, suited for architectural purposes, from Juggiapettah.

No. 9, is a bluish grey limestone highly crystalline of somewhat laminar texture, suited for architectural purposes, from Juggiapettah.

HYDERABAD, NAGPORE, SAUGOR AND NERBUDDA TERRITORIES.

The Madras Central Museum has not, as yet, received many of the beautiful marbles which have been said to exist in the Hyderabad and Nagpore states and in the Saugor and Nerbudda Territories. For the past few years, the Officers of the Hyderabad Army, who have been reporting on the different districts of that territory, have briefly alluded to the geology of the country, but only a few specimens have been sent to us.

HYDERABAD.

No. 1, is a bluish colored compact limestone, from the banks of the Godavary, which Mr. Bell sent to show the numerous borings of some insect. It is similar to some of the compact limestones from the vicinity of Kurnool, and Datchapilly and is suited for architectural purposes. It is possibly from strata of limestone abutting on the Godavary river in the Elgundel circar, which is described as compact, hard, granular, even in texture, with a bluish tinge and an excellent building material.

No. 18, is a slaty limestone which was received from Hyderabad, and is described as from the blue slate formation of Voysey, it is suited for architectural purposes.

No. 27, is a pale teal green, but coarsely crystalline limestone, from Goorjal* suited for architectural purposes. D. G.

No. 39, is an apple green shelly mass of crystalline marble from south of Hutdoor, Neermul hills. This hand-specimen contains small cavities which, if general in the rock, would destroy this marble for all useful purposes. Its color, however, is good.

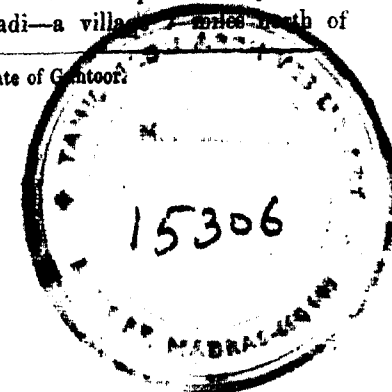
NAGPORE.

Marbles capable of receiving a fine polish are said to exist in various parts of the Nagpore country but few of these have as yet been received by us.

The Revd. Mr. Hislop addressing me from Nagpore on the 14th December 1853, on the marbles of that country, writes as follows; "I am glad to hear of your intention to turn the treasures of your Museum to account by selecting for description those of them, which are of economic value. * * * There are several localities, at which marble is found in this territory, but I have myself observed it at only one. Not being able in person to go into the neighbouring district, on receipt of your letter, I sent a man to two different villages, near which marble is met with; but I am sorry to say that in both cases he returned with lumps of quartz. I can therefore speak merely of the marble, which I have myself seen at Korhadi—a village situated south of

* This place in the Collectorate of Guntoor.
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Nagpore. The dolomitic strata, there developed, rise to the surface for about a mile long, from E. to W., and half a mile broad, from N. to S. They appear to be an under member of the great diamond sandstone or oolitic formation and to be contemporaneous with the limestone on the banks of the Krishna. None of the Korhadi beds, however, are compact—all have been crystallized by the granitic rocks, by which they have been disturbed. The igneous action seems to have run chiefly E. and W.—but it was after it branches off, in a southerly direction, from the western part of its course, that it had most effect on the strata—at the N. W. corner of the area they have been thrown up into two rugged hills of considerable elevation, while a smaller eminence occurs at the S. W. extremity. From these hills the strata, with an occasional interruption, from a transverse intrusion of granite, dip to the east."

"It is not necessary to send specimens of the dolomite, as the Museum already possesses fragments of its principal varieties. It is of all kinds of structure from fine to coarsely saccharine, but the fine is not so prevalent at Korhadi as in the vicinity of Jubbulpore. In color it is generally of a pure white. Its contained minerals are steatite, which, when present in a slab, variegates it with spots of yellowish green or brown, and gives the weathered surface the appearance of being covered with lichens;—tremolite, with its white rhombic prisms—shooting through among the crystals of the mass; and, silicious matter, which sometimes pervades the stone as strings, and at other times envelopes it as veins of jasper and agate. These veins occur on the two hills in the N. W. of the area, and render the rock of no practical use. The stone, which is most adapted for quarrying, and resists the weather well, is that of a moderately crystalline structure, which may be obtained in slabs of 3 feet by 2 feet. The price, on the spot, of a slab of these dimensions is Company's Rupees 1-12 annas. Delivered in Nagpore, it will cost Company's Rupees 2. Very little use is made of the stone—only at rare intervals is it quarried."

"The river Kolar, a considerable tributary of the Khanhan, which again unites with the Wein Gunga, is about a mile from Korhadi, and during the rains would afford the means of conveyance to any distance southwards. I am anxious to ascertain whether dolomite would be of any service, as a flux, in smelting iron, in the same way as the carbonate of lime is used in Europe. If it were,* then the great supply of it, which exists at Korhadi, is most eminently

* I referred this point to Mr. Beaumont of Beypoor, who very kindly replied to me as follows, "I have much pleasure in replying to your note received yesterday. Dolomite or magnesium limestone is considered by Iron Masters as not well suited to iron making. The presence of magnesia in the stone by a small extent, say 10 per cent, does not appear to exercise a very prejudicial effect upon the iron, but the existence of a greater portion of the carbonate of magnesia, as in dolomite, say 40 to 42 per cent, is calculated materially to damage and destroy the good quality of iron that might, perhaps, otherwise be produced. I would not recommend its application in the smelting of iron ores."

situated for transport to the Wein Gunga on the banks of which are stores of iron ore, which all the rail roads in all the world would not exhaust."

No. 35, is a mass of white saccharoid crystalline dolomite from Korhadi 8 miles north of Nagpore, typical of the rock there. The crystals of this specimen are smaller than that next described—it is an excellent marble and seems suited for all the purposes of statuary—D.

No. 36, is a white coarsely saccharine dolomite from Korhadi 8 miles north of Nagpore: it is fit for statuary purposes. D.

No. 49, is a fine crystalline, saccharoid dolomite from Nagpore, suited for statuary purposes. M.

The Museum is rich in other specimens of the minerals and rocks of Nagpore, but these are chiefly illustrative of the Palaeontology of that country. Further north, in the Saugor and Nerbudda territories, the marbles have long been famed.

SAUGOR AND NERBUDDA.

The rocks of the Nerbudda at the first part of its course consist of sandstone, coarse conglomerate, limestone, dolomite, mica slate, chlorite slate and basalt; but, lower down, below Jubbulpore, at the Bhera Ghat, the river flows in a deep narrow stream between two high perpendicular cliffs of snow-white marble, which have long been a favourite object of admiration.

No. 25, is a specimen of that marble. It is a dolomite from the Bhera Ghat or the marble rocks of the Nerbudda, contains a quantity of asbestos (tremolite) white (and sometimes yellow): this specimen was presented by Captain J. Campbell.

A lithographic limestone is said to exist at Murwara where the Mirzapore road enters the Jubbulpore district, and another site of the same is believed to have been found in the north of Damoh district.

The only other marble from those northern territories, however, is one well known throughout Hindustan as the Jeypore marble. It is—

No. 2 and is a highly crystalline limestone, of a pure white color and is suited for all sculptural purposes.

MARBLES NEAR MADRAS.

There are no marbles in the Museum from the immediate vicinity of Madras, at least within a circuit of thirty miles; nor does the series of rocks, received from the neighbourhood, give hopes of any crystalline limestones being found within that range, fit for ornamental purposes. The stone cutters of Madras use rocks from this neighbourhood which they term green and black marbles. These take a good polish and are very durable, and though, amongst people of this trade, any stone is termed a marble on which a polish can be raised, under a more strict nomenclature, marbles, as has already been explained, are meant to indicate some kind of crystalline or compact limestones which these "green" and "black" marbles of the Madras stone cutters are not.

No. 1, is a polished slab of a chloritic talc rock, obtainable at Kovillay near Arnee, about 10 miles from Chingleput. It is known as green marble and is used in monumental erections, and

Nos. 2 and 5 are polished slabs of hornblende rock known here, as black marble. Rocks of this kind are procurable in abundance to the south of Palaveram, near a mosque there, and are used in monumental erections.

Though marble has not been found in the immediate vicinity of Madras it is probable that a search amongst the highly inclined strata in the passes beyond Naggery, would bring to light many useful products. Captain Collyer has discovered and sent to the Museum, a block of blue clay slate which appears to be admirably adapted for a roofing material, all that seems wanting to bring it into use being practical skill in cleaving the mass. The quarriers of slates pass long apprenticeships and it is only after four or five years practice that they are trusted with the splitting of the blocks of clay slates. There are also numerous sandstones, in that neighbourhood which are imported as whetting stones for the coarse cutting implements of the farrier and shoemaker. The only specimen we have of marble, from that neighbourhood, is one formerly sent by General Cullen. It is—

(No. 1472) a coarse and greyish black, and slighty crystalline limestone from Woottamitta suited for architectural and sculptural purposes. D. G.

From the Nellore District to the north of this only one specimen of crystalline limestone has been received. It is—

No. 29, and highly crystalline but from having small geodes in it, it is not applicable to any building purposes. D.

The discovery of marbles in the Nellore District would be of great benefit to this city, as the existence of the Pulicat marine lagoon and Cochrane's Canal, would allow of heavy blocks of rock being brought here, at a very trifling charge. But this Collectorate has been well examined by Captain Ouchterlony who constructed a geological map of it and the neighbouring Collec-

torates, from which it appears that the prevailing rock is gneiss with intruding greenstone, holding out no prospect of discovering marbles, and leaving it even doubtful if the specimen of highly crystalline limestone which I have described above was really found in the Nellore Collectorate.

SOUTH ARCOT AND TRICHINOPOLY MARBLES.

The marbles from these two Collectorates appear to be of the same age. Since Dr. Heyne's time it has been known that a bed of fossiliferous limestone existed in the neighbourhood of Pondicherry, which has long been excavated for pavement,—but it is only recently that Captain Newbold surmised the connection of that bed with strata at Ootatoor in the vicinity of Trichinopoly and at Verdachellum in South Arcot. In all these sites the limestones are filled with fragments of shells and with many ostreas and bivalves almost as entire as if they reposed in their proper element and it is on this account that they have been termed the fossil marbles of Trichinopoly and Pondicherry. The strata in the vicinity of Pondicherry have been made more known to the public by the discovery in their neighbourhood at Trivacary of large fossil trees some of them ninety feet long lying embedded in a loose sandstone. It is Mr. E. Maltby and Mr. J. Bird, who have kindly favored me with the specimens from these two Collectorates.

The village of Seedrapett, the site of the shell-limestone, which is known as Pondicherry marble, is seven miles west of Pondicherry, and Trivacary is about eight miles to the west of Seedrapett. "The form of the country may be characterised, writes Mr. Kaye, as an undulating plain; the limestone formation is flanked both on the east and west by one of red sandy soil which, on the one side, forms the low mounds of Trivacary, and on the other the Red Hills of Pondicherry, the latter being perhaps a continuation of the same formation which contains the silicified wood. If this be the case, it is evident that the limestone rests upon a basin or depression of the red sand, but, owing to the absence of sections and the imperfect means of ascertaining the position of the strata, this fact remains to be established.

The petrifications of Trivacary consist of numerous silicified trees some of them of vast dimensions resting, more or less buried, on low bare hills of a friable red sandstone. The hills are grouped in a circular form, and the petrifications, in many instances, retain a perfect resemblance to the trunks of fallen trees. The red hills are bounded by others of a dark granite; the line of demarcation being very distinct. The trees, however, are not found reposing on the hillocks at Trivacary alone, but are observed at a distance of at least three miles from that place imbedded in the red sand, on the road to Seedrapett.

There is a gradual descent from Trivacary towards Seedrapett and the limestone commences immediately on the boundaries of the red soil. It presents, as has been already stated; an undulating wavy surface, and the stone is found immediately below the turf, and, sometimes, even, appears above it; it is quite hard and is quarried in large blocks though to no great depth, for the purposes before mentioned. It is almost every where replete with shells

or other organic remains which are, in general, so firmly imbedded in the hard stone that it is impossible to detach them. In one situation however there are several small mounds of a whitish limestone, almost resembling chalk,—where the surface having been abraded and decomposed by water, the shells which it contained have been separated and lie scattered on the surface of the soil, among the debris of the containing rock.*

The formation round Verdachellum, a talook of South Arcot, has a near resemblance to that of Trivacary. It consists of the same friable red sand, interspersed with the same small round quartz pebbles and the same indication of iron, and this same resemblance has been borne out by the subsequent discovery of a piece of silicified wood. The limestone containing the shells appears first at the bottom of a valley near the village of Paroor 7 miles from Verdachellum,—the high ground between it and Verdachellum consists of the red sand but the limestone rises into small hills on the opposite side of the valley. In the bottom there is a large nullah, branching from the Verdachellum river, and by the road side the limestone appears in flat slabs, darkened by exposure to the weather.

The fossiliferous marble at Ootatoor in the Trichinopoly Collectorate is a dark and fine grained limestone containing bivalve and univalve shells in great abundance and in a wonderful state of preservation. In all the specimens the shell itself remains, and in many instances retains not only its pearly lustre, but even a portion of its original color. This shell rock is found on a high ridge of land in the limits of the village of Garoodamungalum, Talook of Volcondah, a few miles to the east of the Ootatoor bungalow on the Madras road. The upper surface of the soil is a hard gravel with an admixture of yellow ochre. The stone cutters excavate through this to a depth of about three feet and a half, when rock is found—and when this is broken into, the fossil shells are found embedded in the rock.

There are not many varieties in the marbles from these three localities of which indeed we have but the few following specimens. The accompanying diagrams will show the locality of Trivacary and of that of Ootatoor.

No. 1, is a long slab of shell marble of Pondicherry.

No. 134. Is a specimen of the dark grey compact limestone, imbedding numerous fossils of the supracretaceous series, from Trivacary. This is known throughout Southern India as Pondicherry marble. This marble takes a good polish and is fit for ornamental and building purposes.

No. 3. Is another slab of the marble from near Pondicherry—a breccia consisting of shells in compact limestone.

* Mr. Kaye in No. 23, Mad. Lit. Soc. Journ., p. 37 and No. 38, p. 150.

No. 107. Is similar to No. 134 above described. It is from Pondicherry. D. G.

No. 38. Is a black fossil marble containing numerable small shells from Ootatoor: it is susceptible of a fine polish, and is suited for ornamental purposes and paving.

No. 4. Is a polished slab of the shell marble of Ootatoor, useful for ornamental purposes.

No. 3 is a grand, half polished slab of fossil shell rock, out of which tables, paper weights and rulers are cut and made.

MADURA, TINNEVELLY AND COCHIN.

South of Trichinopoly the country has not been well examined but the few specimens which have been received give a prospect of many beautiful marbles being discovered in the Madura and Tinnevelly Collectorates, and in Cochin. Only a month ago, Mr. C. J. Bird sent me two specimens of pure white dolomitic marbles from Manar Cottah, and the abundance of rocks of a calcareous nature there, leads me to anticipate a very favorable report, as to the extent and quality of the beds of that rock when a proper examination of them has been made.* These specimens were considered here to be equal to the best marbles brought from Rangoon, and appeared suited for sculptural purposes. They were received along with numerous specimens of calc spar which Captain Horsley informs me is very abundant in Tinnevelly in various parts of the district. It crosses the country in lines running in a north-westerly and south-easterly direction and has been met with by General Cullen so high as 2,000 feet above the sea, near the top of a pass leading into Travancore from Stencotta: other specimens of the calc spar received contained molybdena and a green variety of chondrodite. Compact hydraulic limestone is likewise abundant in Tinnevelly and is generally found upraised by granite and gneiss rocks. There is also a bluish white crystalline limestone found in considerable quantity near Ettiapoorum in Tinnevelly (Lat. $9^{\circ} 8\frac{1}{2}$ Long. $78^{\circ} 2\frac{1}{2}$). It crops out above the surface of the ground in large masses and has been used to some extent for masonry works in that neighbourhood. These are marbles, but the specimens received were surface specimens and I am unable to give an opinion on the rock generally. Amongst the specimens which have been received from Tinnevelly also were the two specimens of dolomites from Manarcotta and their value, as a sculptural material, seems very considerable.

Lieutenant General Cullen's constant attention to the mineral products of Southern India has discovered many beautiful marbles. His earliest contributions were of specimens which he obtained in his marches from Hyderabad to Nagpore and in his route via Jaulnah and Ellore back to Hyderabad and Masulpatam and Vizagapatam; and, since the institution of the Museum, in 1851, he has sent several marbles from near Cape Comorin, which will be found described below.

* *Note.*—Since the above was written, Mr. Bird has personally examined this site, and, from his description of it and the specimens which he has kindly transmitted to me, it appears to be a vein of calc spar metamorphosed by the eruption of a greenstone dike, into a granular limestone.