THE CORRESPONDENCE BETWEEN CHARLES LYELL
AND HIS FAMILY AND GIDEON ALGERNON MANTELL:
1821 - 1852

Transcribed and Annotated by
Alan John Wennerbom

A supplementary volume to the thesis
Charles Lyell and Gideon Mantell, 1821-1852:
Their Quest for Elite Status in English Geology,
submitted in fulfilment of the requirements
for the Degree of Doctor of Philosophy

Unit for the History and Philosophy of Science
University of Sydney

February 1999
My dear Sir

Your letter was forwarded to me here from the country some days since wh I have delayed answering in the hopes of being able to procure you some little information. I dispatched my packet to you as soon as I returned from my Sussex tour, I believe on the 11\textsuperscript{th} or 12\textsuperscript{th} of Oct. as you will see I suppose by my letter.\textsuperscript{1} They did not reach you it seems till the 25\textsuperscript{th}. A fortnight from Southton to Lewes! This was unlucky, for had I known how much they w.\textsuperscript{d} interest you I would have forwarded you a large collection at Stonesfield. Will you endeavour to ascertain the cause of the Waggon’s delay, for it strikes me as so careless that I am afraid to ask you to send any to Bartley Lodge – Southampton\textsuperscript{2} lest they sh.\textsuperscript{d} be lost on the way. If you can send me any be sure they are duplicates & only such as you have or can procure in abundance, for as I only wish them for instruction & have no choice cabinet, you would throw away your pearls. Unfortunately, neither Bucland [sic] nor any of the best Geologists were at Oxford the week I spent there, so that I c.\textsuperscript{d} not see Bucland’s fine collection – & the rain prevented anything but a hasty visit to Stonesfield where I procured a good box full, many the same as what I sent you, I left a commission for these to be sent into Hants. Tell me what was the carriage of my box to you? I heard at Oxon. that Bucland was getting his Stones.\textsuperscript{d} fossils engraved on stone in France.

[*]\textsuperscript{3} What weight of Evidence do you require to identify beds? You say you detect decided differences in many of these organic remains. How is it possible it sh.\textsuperscript{d} not be so if they sh.\textsuperscript{d} really contain each the same? Put 2

\textsuperscript{1} Following their initial meeting at Lewes on 4 October, 1821, Lyell sent Mantell “an interesting collection of fossils”, which was received on 25 October. Mantell’s Private Journal further records that Mantell wrote to Lyell on 27 October. \textit{GAM-PJ}, entry 27 October 1821.

\textsuperscript{2} The Bartley Lodge property, near Lyndhurst on the edge of the New Forest, was leased by Lyell’s father, Charles Lyell Senior, as the family’s residence in the South of England. K. Lyell, \textit{LLJ-CL}, vol. 1, 1881, p. 2.

\textsuperscript{3} Text between asterisks is quoted in Wilson, \textit{Charles Lyell}, p. 94.
alphabets back in separate box & then take out at random 6 letters from each, would you expect half of them to be the same? And how do the odds increase ag'ist us, when there may be 5. or 50. thousand in each. Consider they are both slates both calcareous, both sometimes inclining to sandy slates both contain Amphibia – Aves, Pisces, testacea, vegetables, mixed together - How few have you compared & yet how many of these few agree exactly. Why sh’d there not be many kinds of Monitors in each? [*]

I have examined Greenough’s collection & copied you a list of his Stones. fossils with his No.’s affixed.

<table>
<thead>
<tr>
<th>In G. B. Greenough’s Cabinet. Stonesfield Slate</th>
</tr>
</thead>
<tbody>
<tr>
<td>12039. Silurus Ballinia dorsal spine</td>
</tr>
<tr>
<td>12137. Fishes Gill ← flat</td>
</tr>
<tr>
<td>15442. Spine of Echinocidaris Nerifer</td>
</tr>
<tr>
<td>Palates of fish 12128. 12134.</td>
</tr>
<tr>
<td>12128 Tooth of fish Tooth of fish</td>
</tr>
<tr>
<td>12129. 12021.Birds bone 12025. Birds bone</td>
</tr>
<tr>
<td>12130 &amp; 12132 &amp; 12131 like teeth I sent you some bent tooth of fish</td>
</tr>
<tr>
<td>13078. Anomia</td>
</tr>
<tr>
<td>Terebratula. Shells &amp; Ammonites A few plants &amp; vegetable</td>
</tr>
<tr>
<td>impressions like those I sent you.</td>
</tr>
</tbody>
</table>

He tells me the Stonesfield slate is extensive being found in the following counties Bucks. Dorset. Glocester. Lincoln. Northampton, Oxon. Somerset. Wilts. His specimens from some of these distant [ink-blob: word indecipherable] agree admirably yet perhaps the Geol.' appearance may differ as widely now & then as yours.

In a letter from Bucland to Greenough are these words “Cuvier has no doubt that the great Stonesfield beast was a monitor 40 ft. long & as big as
an elephant”.

In a small draw [sic] of Stonesfield slates in the Geol. Society are the following. 1 Madrepore (of wh I have procured a fine one). 2. spines of Echine. 3. Ammonites. 4. Nautilus. 5. Woodcoal. 6 Scales of Testudo. 7. Jaw of lizard with teeth. 8 Tooth – I remember Bucland has some fine Testudines. You tell me the teeth No. 17 to 22 occur with you but very rare so are they very rare at Stonesfield. I c. d hardly get any, tho’ the quarrymen at this last visit had chests full of fossils. Of birds bones I c. d not get one & those I sent you are better than any here in town. I cannot here [sic] of any Euphorbia. I have kept your secret.[*] Let me know what Hawkins⁵ says of the Whin, but do not write to me before Xmas unless I can be of use to your work by getting you any information, for I am buried in the study of Law here & am too fond of geology to do both. It is not so compatible with my Profession as with yours.[*] I cannot give you any answer at your very kind invitation to visit you at Cuckfield, as yet, but can only say that if possible, I sh. d like it in spite of the Sessions.

my compl.⁴ to Mrs Mantell & believe me dear Sir
yours very truly
ChaLyell Jun.⁷

P.S. In the papers you gave me you placed Plastic Clay over London Clay – You do not mean this? Where w. d come Druid Sandstone?

[ Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]
Dear Sir

It was with great pleasure that I received your letter on Monday, for it happened by a strange coincidence enough, that on that very morning I had closed my Law Books with which I have been exclusively employed & was thinking of writing to you & begging you would forward the parcel you had been good enough to promise me to “Bartley Lodge, Southampton”.

It will be particularly acceptable to me now to have some of your shells, with their names from the beds above chalk, for G. Sowerby has written 2 pamphlets in the Phil. Trans. to prove that Webster is wrong in regard to Headon Hill & that there is only one freshwater Formation above the London Clay & no upper marine interposed. This made Webster revisit the spot, confirm by large collections (to be sent to Brogniart [sic] & recognised by him) of the freshwater & marine shells, all his observations, & led him also to examine the opposite coast of Hants. at Lymington &c & follow on the freshwater formation there where he has found it in such force as to strengthen me in a guess wh. I had made that some marls close to us at Bartley & wh are over the London clay, are the lower freshwater stretching inland.

I embrace with great pleasure your new light concerning the Tilgate beds. The Purbeck stone has never been found oolitic & perhaps in the imperfect state of our knowledge there is not a more characteristic mark than the roe-like texture by which we can discover a certain era which ceased about the time of the deposition of the Portland beds. Nothing like “the oolites” has been found in your great vale of denudation? Now it is remarkable that, close to Cuckfield in Smith’s first great Geol. Map of Eng. there is a round blue mark in the iron sand near Cuckfield, (rather

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6 The two pamphlets by George Brettingham Sowerby (1st.) were: ‘On the Geological Formations of Headon Hill in the Isle of Wight’, Annals of Philosophy, 1821, 2, pp. 216-220 and ‘On the Means of distinguishing Fresh-water from Marine Shells’, Annals of Philosophy, 1821, 2, pp. 309-312. Lyell made a mistake when he identified the Journal as the Philosophical Transactions of the Royal Society of London.

7 William Smith (1769 - 1839). Land surveyor and stratigrapher. In 1815 Smith published, A Delineation of the strata of England and Wales with part of Scotland. (Scale: 5 miles to one inch). DNB.
West it is true) which colour is explained “Purbeck stone, Kentish rag, vale of Pickering” showing his doubts for he c.\(^d\) hardly have thought the Purbeck & Kentish the same. Some parts of the Stonesfield bed resemble much the specimens of Purbeck in the Geol. Socy. Museum & turtles are found at Purbeck, trees, shells, teeth, &c. also the houses are roofed in Purbeck with a coarse slate of that stone. It is true the Tilgate fossils are strikingly more like those of Stonesfield in appearance & nature than to the Purbeck but you are acting much more Philosophically in preferring if possible to identify those with the latter. When the Geognostic position of 2 distant beds is the same it is better in favour of such Evidence to put up with a considerable want of agreement in the organic remains, than in order merely to reconcile the latter, to pronounce on an extraordinary chasm in the usual order of succession.

Have you seen the last Vol. of our Trans.\(^5\)? Webster has there given a section\(^8\) from the Chalk of Merstham to Nutfield exhibiting a succession of Chalk. Ch. Marl, Green sand, blue marl, iron sand all in Greenough’s (& I believe your green sand). I told you at Lewes that I felt strongly inclined to believe the iron sand of Shankline chine, & that near Petworth the same. I am confirmed in this now by an examination of specimens & by the important fact that what is truly green sand & the blue marl under it (Buckland’s Tetsworth clay), are known by Webster to feather out near Guilford & the real ferruginous sand to come up close to the chalk with apparently nothing between. Just so is it in all the North of England where Buckland’s Green sand & Tetsworth clay are both wanting, & the chalk resting on the iron sand is tinged with red. So that I would believe in the absence of a positive section to the contrary that almost the whole of Greenough’s zone of green sand, is in truth what assuredly every one who has seen it, must wish to prove it, the iron sand. And why not? Buckland puts the Weald clay subordinate in his syllabus to the iron sand. If our Forest sand is merely a lower bed of the same iron sand & therefore just where the Purbeck ought to come. In the true iron sand of the I. of Wight beds of clay are seen as at Sandown, answering to your weald clay & also beds of limestone exactly like what I have seen in the iron sand near Midhurst. Even therefore if you c.\(^d\) prove that the Weald clay does lie between the ferruginous sand wh. Greenough paints green-sand

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\(^8\) T.Webster, ‘Section of the Strata between Merstham and Nutfield to accompany Mr Webster’s paper on the Reigate fire-stone’, *TGSL*, 1821, 5, series 1, Plate 38.
& the forest sand still I sh.\textsuperscript{d} be disposed decidedly to say it was all the iron
sand of the I. of W. separate from the green sand (if it were there) by the
Tetworth clay wh. perhaps is also absent.

With my comp.\textsuperscript{\textdegree} to Mrs Mantell

believe me yours truly

ChaLyell

P.S. Bucland assured me last month that the \textit{Opossum!}\textsuperscript{g} had been found at
Stonesfield, & recognised by Cuvier! I am going to Hants in a day or two.
C.L.

[ Addressed to: Gideon Mantell Esq. Lewes, Sussex ]

3

\textbf{Charles Lyell to G. A. Mantell}

29 Norfolk St. Strand

Feb.\textsuperscript{\textdegree} 8.\textsuperscript{th} 1822.

My dear Sir

I hardly know what reception a letter from me has any right to
expect from you, comes after I have explained the reasons for my long
silence after receiving so handsome a present as that you were good enough
to send into Hants. But the truth is I intended to come to town immediately &
expected to find you here & therefore having nothing but thanks to

\textsuperscript{g} Mammiferous remains from the Stonesfield slate were examined by Cuvier and pronounced as
communicate deferred them to our meeting.

[¹] Tho’ I was detained late in the country I found you had not yet arrived with your book, but I still thought I sh.³ see you at our Annual Geological dinner. I now begin to despair or rather to hope that your professional practice has increased so much beyond your expectation that you find it impossible to leave Lewes. Of the collection which came quite safe in 10 days I can only say that I trust among so many invaluable & interesting specimens you have not robbed your own of any which it might might have been more advantageous for Science that you had retained. The Professors of Cambridge & Oxon² were present at our dinner & Bucland was called upon to explain the vast quantities of bones which he found in the summer in a cave at Kirkdale in Yorksh. of wh. he had a large bag-full with him – innumerable jaws of hyaenæs, teeth of Elephant, Rhinoceros &c. unmineralised like those in the limestone – caves in Germany full of bears. He produced some light balls or pellets wh. he said he brought to town at first doubting what they c.⁴ be. Dr Wollaston (I think) first pronounced that they were like some calculi sometimes found in some species of Canis. Upon being taken to Exeter Change by Dr. Fitton the man then recognized the production & exclaimed “Ah that is the dung of our hyaena”! On analysing it they find it composed of carbonate & phosphate of lime, the same as hyaena’s dung, which being an animal it seems of an ossiphagous appetite, has always its dung proportionally more ossified than any other. [²]³ Bucland in his usual style enlarged on the marvel with such a strange mixture of the [humorous? – page torn] and the serious that we c.⁴ none of us discern how far he believed himself what he said. [²]⁴ Take the following as an example of the whole. “The hyænas, gentlemen, preferred the flesh of elephants, rhinocerus, deer, cows, horses, &c but sometimes unable to procure these & half starved, they used to come out of the narrow entrance of their cave in the evening down to the water’s edge of a lake wh. must once have been there, & so helped themselves to some of the innumerable water-rats in wh. the lake abounded – thus you see the whole stalactite & the other bones stuck over with the teeth of water-rats”.[*]

² Revd. Adam Sedgwick and Revd. William Buckland.
³ Text between asterisks is also quoted by Wilson. Charles Lyell, p.95.
⁴ Text quoted in K. Lyell, LLJ-CL, ceases at this point but subsequent text between asterisks is quoted in Wilson, Charles Lyell, p. 95.
The researches I made at Xmas are I am afraid sufficient to prove that I must give up my hopes of discovering the I. of Wight fresh-water formations in our part of Hants, but the shells are not yet come to town wh. will enable Webster to decide. Hoping that your young family are well \& with my compliments to Mrs Mantell believe me my dear Sir yours most truly

ChaLyell

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]
themselves among the patrons of Science. You will easily believe me that it does not arise from such vanity that I regret that my name is not there but simply from this that no one can with such good grace ask others to subscribe as one who appears in print as subscriber himself. I would advise you if you have many of the old ones in hand to add the names in writing before you send a good number to town which I think it very desirable you should do immediately. Mr T. Smith\(^9\) seems well inclined to exert himself in distributing them.

\(^{[*]}\) I have spent some days lately in investigating the country from Godstone to Merstham – Reigate – Bucland – Betchworth & Dorking & feel sure that the green sand is there exactly as the I. of Wight – & I traced a bed of black blue marl or clay 200 feet upwards in thickness, between the bed in which the firestone is & the ferruginous sand, the whole way from Godstone to Dorking.\(^{*}\) I hope to continue this hereafter wh. will make me visit you with much more interest & profit for \(^{[*]}\) if the green sand of Folkestone c.\(^d\) be traced in a continuous bed to the Reigate bed of firestone I feel sure that Greenough c.\(^d\) no longer continue to paint in his Map the iron sand as green-sand & nothing was ever more exact in resemblance &c than that country I went over & the I. of Wight as far as those four beds – 1. Hard grey chalk marl. 2 Green sand – 3. blue marl or black Earth – 4. iron sand. But I am aware what great difficulties there may be in reconciling this with other parts of your country.\(^{*}\) believe me with compliments to Mrs Mantell

Yours very truly

ChaLyell

P.S. I send you Bucland’s epitaph as well as Conybeare’s stave.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes ]

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10 Text between asterisks is quoted in Wilson, *Charles Lyell*, on p.104
11 Text between asterisks is quoted in *ibid.*, p.104.
My dear Sir

[*]¹ I fear you may think I have but little motive for troubling you with a letter since it is no other than to inform you that I am today setting out for Winchelsea where I shall pass nearly a week with a friend who will leave me ample time for geologizing if I can find a field for such operations - & for myself I have little doubt of this since the country is so entirely terra incognita to me but can you not also make me useful to you in ascertaining any fact or procuring any specimens. [*]² If so you would do me a great service in favouring me with a letter in good time.[*]

² In several short expeditions wh I have made into Surrey I have examined very carefully the junction of the chalk with the beds below about Merstham,³ Reigate, Dorking and Guildford. I have brought specimens from what Webster w.⁴ have us call the ferruginous sand exactly like some brought from the green sand of other parts wh. certainly creates a great difficulty,[*]⁴ but still there seem to me only partial beds in that wh we should decidedly call iron sand in any other place & I still think that if we were determined to name beds by analogy to those of which Webster first drew the line in the I. of Wight we should be obliged to pronounce that the green sand is wholly wanting at Guildford & Greenough seems clearly to entertain great doubt on this lead himself, but when I have worked more Eastwards in Kent I shall be better able to form an opinion.

Since you were here there came up from Stonesfield to the Geol. Soc.⁵ a most enormous bone of some great unknown animal & Clift pronounced it new but finds it belonging to the same animal as one wh. Capt Vetch⁶ some

¹ Text between asterisks is quoted in K. Lyell, LLJ-CL, vol. 1, p. 116.
² Text between asterisks is quoted in ibid., p. 116, and also in Wilson, Charles Lyell, p. 104.
³ Merstham was omitted in the quoted extract in note 2.
⁴ Quoted extract in Wilson, Charles Lyell, ceases at this point, but continues in K. Lyell, LLJ-CL, p. 116.
⁵ Captain James Vetch (1789 -1869). Served in the Royal Engineers 1808-1824. GSL Councillor.
time since sent from the neighbourhood of Cuckfield! [*] Beware of Poachers in your ground but you need not fear Vetch.

[*]\(^6\) Would it not form a strange addition to the wonderful coincidence already discovered by you between your beds & those of Stonesfield if an immense new animal sh.\(^d\) at the same time be found in each. This animal they say must be as large as an Elephant but I can not learn of what kind they conjecture.[*]

Yours very truly

ChaLyell

P.S. As I do not know yet my friends No. direct to the Post Office Winchelsea if you please – C.L.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

Charles Lyell to G. A. Mantell

29 Norfolk Street  Ap. 19  
1822

My dear Sir

[*]\(^7\) Although I did not leave Winchelsea until Tuesd 16\(^{th}\). yet your letter [*] (so tardy is the communication between such neighbouring places) [*]\(^8\) did not reach me there but has followed me to town. Had I received it in time I might better have deserved the crown which you held up

from 1830-32. DNB.

\(^6\) Text between asterisks is quoted in K. Lyell, *LLJ-CL*, vol.1, p. 116.

\(^7\) Text between asterisks is quoted in *ibid.*, p. 119.

\(^8\) Text between asterisks is quoted in *ibid.*, p. 119.
to my ambition for I had no sooner begun my examination of the cliff there than I found myself in the midst of the limestone beds with every character of strict identity with those of Battel & Hastings particularly that gloss of rather the feldspar appearance wh. you know marks it & in which Webster was one day pointing out to me it closely resembles the chrystallized part of the Fontainbleau rock & no doubt it is owing to incipient chrystallization.

The present town of Winchelsea is situated on a rock wh. projects like an island from the alluvial marshland wh. surrounds it & which was once at no ancient date flooded by the sea. It presents a cliff more or less high towards every point of the compass. Close to the road-side near the ancient gate which leads to Rye is a quarry wh affords a most satisfactory section of part of the rock. At the top is sand & sandstone not much indurated nor highly ferruginous, then comes immediately under & distinct from it, with not the least passage from the one to the other a bed of the limestone very hard & siliceous 5 feet thick, beneath this comes the sand again of what thickness I c. d not ascertain - so much for the quarry wh. ends at the level of the road, but lower down the cliff appears another bed of the limestone wh. must be far below the former & proves therefore the alternation. The flat slabs of the limestone when weather-worn afford generally casts of innumerable small bivalves of this size (perhaps cardiums) & so does the sandstone exactly the same. In a walk of 4 or 5 miles along the high cliffs between Winchel. a & Fairlight Cliff I could see none of the limest. e in the ferruginous sand but I w. d have made more particular search had I known you had not been there.[*] I suspect from what I saw of Rye that it stands on just such an isolated rock as Winchelsea, & with the limest. e no doubt. The sand near Pett & Fairlight is sometimes white but never hard except when boulders are indurated by the sea & then it resembles the Druid sandst. e wonderfully.

The few specimens wh. I brought of what I have alluded to I sh. d have great pleasure in sending to you but think it not worth while to put you to the expense till you say you wish it. [*] 9 What little I c. d see of the Weald clay makes me think it quite subordinate to the ferruginous sand & to doubt more than ever its answering in position to the Tetsworth clay of Bucland’s syllabus.

Buckland has received from the Yorksh. Cave in addition, the bones of

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9 Text between asterisks is quoted in *ibid.*, p. 119.
the weazel, the rabbit, the pigeon & I believe one other bird in a beautiful state of preservation & wh. are being drawn for the R.S.

Do not fear any poachers on your Sussex preserve. I wish I c. see so much activity as to give cause of fear. At our meet. I will not fail to introduce your prospectus & nothing will give me greater pleasure than to take the first opportunity of paying you a visit.[*]

Yours truly

ChaLyell

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

7

Charles Lyell to G. A. Mantell

[5 June 1822]

My Dear Sir

I thought it might perhaps save you trouble if I draw up the few remarks wh. I have to make on the Horsham strata in a separate letter that you might send them in the same shape to the Society, but as to this you will of course follow your own plan & I am by no means desirous of being mentioned any further than bearing the responsibility of any errors wh. may probably exist in my statements & observations.

[*]¹ When I took my specimens to compare them with Battel & Winchelsea, Webster showed me a set from Hastings wh. he had collected 8 yrs. since but had published nothing concern.⁸ them, save that in his ‘Order of Superpos.² in Sir H. Engle.d’s² I. of Wight³ he tells me he included these beds in Iron Sand Formation. If so he was the first who assigned a proper position to beds wh. from the series wh. he presented to the Geol. Soc.⁷ are

¹ Text between asterisks is quoted in Wilson, Charles Lyell, p. 105.
² Sir Henry Charles Englefield, Bart. (1752 - 1822). Antiquary and amateur scientist. DNB.
strictly identical with those of Cuckfield but if he lays claims to more you
have nothing to do with what he knew if he did not publish it to the world. He
said he sh. d himself communicate with you on that subject.

I am sorry I have given all my Winchelsea specimens to the society
but they are all the same rock & you had better lose no time in declaring this
to be your opinion.[*]

Great complaints were made by T. Smith at Linnean S. on Tuesd’y at
his copy being so late & a friend a subscriber in Country having none. I
wrote to Relfe & to tell him Fitton’s address whom he sh. d have sent a copy
to. In excuse he says he knew not F’s address – that his binder has illused
him &c. I fought your battle with T.S. as well as I c. d but it is an unlucky
business.

The specimens from 2-16 answer to the section. 13 was out of the
Coltstaple stone – organic? The slab No. 14 is from Sedgwick part of a large
one furrowed on opposite sides at right angles the one to the other. The face
marked 14 is the upper one evidently I think worn by waves. The under side
on that part of the slab from wh. I struck off this piece had another layer
adhering to it into wh. it fitted & part is now sticking on.

The small marked 14. Were taken out of the
Stammerham limestone.

I also send specimens of the marl at Dorking wh. holds place of
firestone. of the latter I have now also some from Betchworth of green cherty
sand and blue marl. The great escarpment wh. Leith Hill & the others of your
Green Sand Format. n present to Weald clay is I think one of the strongest
points ag. t Webster’s doctrine.

Remember me to Mrs Mantell & believe me
Yours very truly
ChaLyell

29 Norfolk St.
June 5, 1822

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes.]
Dear Sir

I have visited Horsham on my return to town & have examined the quarries in its vicinity as you requested. I hope the specimens which I send you & the information which I have been able to collect will be at least sufficient to satisfy you that your conjectures were not unfounded, & that the strata around Horsham belong to the same series as those which you have so fully investigated & described in your late work.¹

The most considerable of the quarries in the neighbourhood of Horsham at the distance of about 2½ miles is that of Stammerham, the property of Sir Tim Shelley² of which the following is a Section beginning at the top & of which I send you specimens.³

<table>
<thead>
<tr>
<th>Section of Stammerham Quarry</th>
<th>Provincial Terms</th>
<th>Thickness ft. in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vegetable Mould</td>
<td>-</td>
<td>1. 6.</td>
</tr>
<tr>
<td>2. Strong clay &amp; loam</td>
<td>-</td>
<td>9. -</td>
</tr>
<tr>
<td>3. Layer of compact limestone with deep undulating furrows on upper surface</td>
<td>Rough Causeway</td>
<td>4. -</td>
</tr>
<tr>
<td>4. Same rock more indurated, the best in the</td>
<td>Scrub</td>
<td></td>
</tr>
</tbody>
</table>

³ The following section of Stammerham quarry was included in Mantell’s paper, ‘On the Iron Sand
<table>
<thead>
<tr>
<th>Country for roadmaking</th>
<th>Stone</th>
<th>1. 4.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper layer 4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lower 1 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Sandstone ferruginous which they beat for bricks.</td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>7. A blue soapy marl, has been tried in Agriculture but with little success.</td>
<td>-</td>
<td>1. 6.</td>
</tr>
<tr>
<td>8. Ferruginous sandstone, same as No. 6.</td>
<td>-</td>
<td>1.</td>
</tr>
<tr>
<td>10. Compact limestone of finer texture than any of the above, taken out in large slabs &amp; makes an excellent paving stone for kitchens &amp;c. Slightly marked with undulating furrows on the upper surface.</td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>11. Marl sunk thro’ but not worked.</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>12. Stone in slabs reached by boring.</td>
<td>-</td>
<td>unknown</td>
</tr>
</tbody>
</table>

In the limestone No. 10 the bone of an animal was found some years since which they say was like a hog’s rib, & from the description I have no doubt it was similar to some which you have procured from Cuckfield. But organic remains appear rare. I could discover no shells. But branches of vegetables in a carbonized state are often met with, & I myself, saw some small specimens.

The quarry of Tower Hill near Stammerham resembles the former in its products & strata so nearly that it is unnecessary to describe it. Near this a petrifying and incrusting spring occurs which convert[s] the vegetables in the ditches thro’ which it flows into calcareous tuff.

Early the following morning I was induced to visit the quarries of Sedgwick about 2 miles from Stammerham by observing in the pavement of the streets of Horsham slabs of that stone with the furrowed surface laid uppermost. In which manner I was told they were placed “because the under side was still more strongly ribbed”.

At Sedgwick I found a large quantity of the slabs ready-quarried, & many furrowed on both sides. As I had before felt satisfied that the surfaces had been scooped out by the waves of an ocean (an hypothesis which you have suggested in your work⁴) I was greatly surprised by this fact. [*]⁵ I will add too, I was greatly disappointed, as I hope every Geologist is when he finds himself compelled to abandon a theory which refers not without probability to the agency of known causes, some of the many obscure phenomena which his investigations daily disclose.[*]

I observed that the opposite sides of few of these slabs corresponded; in some the furrows of the inferior were even at right angles to those of the upper side. They could not therefore in such instances have received their peculiar shape from any constitution of the lamina when in a soft state.[*]⁶ Most of the slabs I found would cleave into thinner laminae & the inner faces were also furrowed, & fitted smoothly into each other. If this last fact should prove on further examination as invariable as I found it, I should entertain

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⁴ In his work, *The Fossils of the South Downs*, Lupton Relfe, London, 1822, p. 41, Mantell commented that: “the furrowed appearance on the surface of the sandstone, as already remarked, is of frequent occurrence in the arenaceous strata of Sussex, and, doubtless, has been produced by the advance and retrocession of the waves”.

⁵ Text between asterisks is quoted in *Charles Lyell*, p. 106.

⁶ Text between asterisks is quoted in *ibid.*, pp. 106-107.
little doubt that the under side of each layer merely presents a cast of that on which it has been deposited. And when many thin layers succeed each other, we have only to suppose the lowermost to have been deeply worn by the waves & that it then formed a mould into which the next layer was cast, & the others successively into those which preceeded them.[*] But when the furrows of the surface take a new direction we may again suppose the waves to have acted. If it be objected that when a new stratum of sand was washed up it would fill all the inequalities & reduce them to a level, I can only answer that I therefore assume that the beds were precipitated from a fluid in a certain state of tranquility. Nor is this supposition necessarily at variance with the occasional agitation which has worn some of the slabs, for the deposition may have gone on when the land was entirely covered by water, & the excavating power may have operated only when the waves were advancing or retreating.

[*] That the most indurated of these rocks was in a perfectly soft state when first formed, no one will dispute who observes the manner in which the organic remains are imbedded in them. [*] I regret that I was prevented from prosecuting my enquiries concerning these curious appearances at Sedgwick, as the workmen were not employed there at the time. The ferruginous sandstone of which the town-hall of Horsham is built & which comprises the greater part of the district, is also in general furrowed on its surface, & sometimes to a great extent, & [*] presents so striking a resemblance to a sea-beach worn by the waves, that it has not escaped the observation of many of the common labourers.[*]

Mr Heath surveyer of the roads informed me that the dip is very variable & that he had known it in every direction. That the beds are however in some places perfectly horizontal, as they work the same strata of stone to a considerable distance without descending deeper. He also favoured me with the following localities of the Horsham stone, which I add as it may prove of service to future investigations & may show the extent round Horsham.

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coltstaple</td>
<td>2</td>
<td>South</td>
</tr>
<tr>
<td>Southwater</td>
<td>2 ½</td>
<td>S.W.</td>
</tr>
<tr>
<td>Broadbridge</td>
<td>2</td>
<td>W.</td>
</tr>
<tr>
<td>Slinfold</td>
<td>3</td>
<td>N.W.</td>
</tr>
</tbody>
</table>

 [*] Text between asterisks is quoted in *ibid.*, p.107.
 [*] Text between asterisks is quoted in *ibid.*, p. 107.
Of these the specimens which I saw from Coltstaple & Warnham I thought came nearest to those of Tilgate Forest. You will I am sure regret that your avocations have denied you sufficient opportunities to study with care the Collection of the Society. Among the specimens from Battel presented by Mr Benett is one which exactly agrees with the limestone of Cuckfield & contains black carbonized wood imbedded in the same manner in the bluish stone. There is also a series of specimens collected by Mr Webster (8 years since) from the cliff at Hastings which still more closely correspond with those of Tilgate forest. Some of these specimens enclose the teeth of fishes, vegetable remains & the rib of animal wh.I would suspect you would find to answer some in your collection. I have little doubt that the Geological formation of all these distant beds is the same & hope it will not be long before you are enabled fully to clear it up. The beds of ferruginous sand & clay which at Horsham & Winchelsea alternate with the limestone agree with those of the iron sand Formation in all their characters as far as my experience enables me to judge.

believe me

Yours very truly

ChaLyell

London June 6. 1822

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

9

My dear Sir

There was so much in hand at the Geol. Soc. that Dr Fitton assured me it was out of his power to read your paper which is most unlucky as this is the last meeting for many months. Perhaps the best thing I can do is to present together with those you sent, duplicates of my Section of Stammerham at the next meeting. By annexing a catalogue I can combine to introduce your opinion as to the analogy of the beds. Greenough told me last week that he believed the Battel beds to be the lowest & fast approaching to the character of the Purbeck, a remark which shows how justly he has thought of these formations. I beg you will understand that I never meant to pronounce on the continuity of any of these numerous seams of calcareous rock. [\*] Webster was highly delighted with the marm rock of W.S. but regretted you had given no precise locality. It proves identical with his green sand of the I. of Wight so that no one could distinguish them, & the fossil body contained in the specimen you sent was the same as occurs in all his I. of Wight specimens in our Coll. .it also is the Reigate firestone. He observes not without reason that he is right because his type of the Greensand is that of the I. of W. Yours & Phillips & Greenough’s may be that of other parts as Wilts. Cambridge &c. Of the Bletchingley fossils he says he sh. like a section of all the beds there, & that the Galt of Cambridge. \*b has never been accurately made out as to its position & relation with other parts.[\*] For my own part I do not think the mischief is very formidable for whether the I. of W. must be considered the exception to the general rule in Sussex, it is not a greater discrepancy than we are accustomed to elsewhere.

\*1 William Henry Fitton was Secretary of the GSL from 1822-24. Woodward, History of the GSL, p. 296.
\*2 Mantell’s paper was a Notice ‘On the Iron-Sand Formation of Sussex. In a Letter to Dr Fitton, Secretary of the Geological Society’, [14 June 1822], TGSL, 1826, 2(1), series 2, pp. 131-134.
\*3 Text between asterisks is quoted in Wilson, Charles Lyell, p. 107.
\*4 West Sussex.
But if W.'s blue marl No. 3 sh. prove to be galt as I think possible, it w. certainly be difficult enough.[*]

Your specimens were so loosely marked that some no's. were lost in unpacking but I believe I restored them right – but there was nothing marked on Cuckfield specimens & the drawing did not apply to the bones you sent so as to explain them - the size of the latter alarmed them since they have no accomodation & to go on with glass cases w. be ruinous. Dr Fitton sent back his copy to Relfe & ordered one of his own booksellers for as he wishes to be known as a Patron of Science he was sore at finding his name omitted in list of Subscribers. I shall go to Scotland soon & must defer your obliging invitation till I return.

[*]^7 I have set up blow pipe, magnetic needle &c & am working away at primitive formations. Conybeare's is a delightful book. It will make

[^6] In conjunction with his paper ‘On the Iron-Sand Formation of Sussex’, *op. cit.* (note 2), Mantell presented to the GSL organic remains that he considered characteristic of the strata of Tilgate Forest. These included “Teeth and bones of crocodiles and other saurian animals, of an enormous magnitude”.
Geology as fashionable as Botany was, & I hope more so. His style is perfection.[*]

With my best remembrances to Mrs Mantell believe me very truly yours

ChaLyell

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes. ]

Charles Lyell to G. A. Mantell

Bartley Lodge  July 4
1822

My dear Sir

You will I expect be somewhat surprised & I am sure agreeably, to hear that out of the few days which I have spent in Hants prior to my Evacuation into Scotland, I have been able to give 2 days to the I. of Wight & Geology. I directed my course to that fine section of the beds below the Chalk afforded by Culver & Red Cliffs & Sandown Bay with a view of forming my opinion on that multum vexata quaestio, the analogy of y.' I. of W. & Surrey & Sussex. I wish that the short sketch wh. alone I can give you of my observations carefully compared with the series of specimens may

structure of four foreign countries illustrated by a coloured map and sections, Phillips, London, 1822.
make it so clear to you as it is to me that the difficulties have all been created by ourselves & that there exist none in Nature. You are aware that the phenomena presented by this part of the I. of W. are the same as those of your great valley of denudation, & that the same beds wh. in the North side dip to the North in the South dip to the S. but in the I. of W. the Chalk & beds immediately below of the S. side are less inclined than your S. Down whereas, in the N. as if to compensate for this they are vertical.

When the 2 corresponding sides of this Section have been studied with time & patience wh. you know is required to discover the order wh. once reigned I am confident they w. be found to fit in as correctly as in the above diagram. But I wish to presume that I have not yet done this. I have merely as yet examined with attention from the grey Chalk of Culver to the iron & green sands of Red Cliff & I have also collected partially specimens from the other innumerable beds of sand & clay wh. follow in succession below them till the order is inverted & you mount again towards the chalk. These last specimens you must merely consider useful as giving an idea of some of the most striking character of these beds & not as a regular perfect section.

Catalogue referring to the Section A & B
& to the numbers on the specimens.

1. Chalk without flints.

2a. do. lowest beds more indurated.

2b. do. where alternating with chalk marl. Being whiter than the C. marl it forms a curious striped appearance. streaks of distinct blue & white
following each other for a long space, about a foot in thickness each

3a. Chalk marl of Webster. is very blue in the cliff. breaks with conchoidal fracture. contains pyrites.

3b. Do. lower beds. more blue. Inocer. might not this pass easily into the blue chalk marl rock of Western Sussex?

4. Green S.\textsuperscript{d} of Webster. same as firestone of Reigate & marm rock of W. Sussex. specimens also from Brading down about 2 miles from Culver - veins of chert traverse it. Appears at a distance very like chalk. Especially at Culver Cliff where it is seen below the blue marl No. 3 & the blue marl No. 5.

4#. Do. After a diligent search I selected this specimen as being the greenest in the whole bed & this was in very small quantity. Webster's Green Sand both here & in y ' undercliff is in general as white as the whitest specimen from Brading down. Does not the French term “craie chloritee” appear very descriptive of Webster's Green Sand?

5 Blue marl of Webster. This bed you will perceive by the Section B is of inconsiderable thickness & as no peculiar fossils have yet been found in it it does not deserve the distinction wh. Webster has given it. It is merely in my opinion one of the alternating beds of the Series which follows of sand & clay beds.

6. Iron Sand. – this is the same I.S. which occurs so near the Chalk in Surrey, probably. for it resembles that of Guildford &c.

7a. Great beds of this greenish white sand occur in the ferruginous sand traversed by thin seams of blue marl, an inch & sometimes more in thickness. This marl resembles No. 5 apparently.

7b. The blue marl above alluded to traversing the sand from top to bottom of the cliff in black lines.

8. Considerable beds of this alternate with iron Sand & as they resemble the blue marl No.5. they seem to diminish the importance wh. Webster has assigned to that bed.
9. Green Sand in numerous beds alternating with ferruginous S. as they are greener than any that can be found in Webster’s Green Sand, yet not so green as some wh. must occupy nearly the same situation near Shanklin, it is perhaps to be regretted that Webster in his Classification did not assign some other term to them than ferruginous S. \(^d\) wh. has mislead many.

10. A few specimens from a succession of beds which occupy a great space between Red Cliff & Sandown. iron sands – clays &c &c.

11. Purple & other clays of very considerable thickness – containing subordinately some beds of sand. These I have little doubt are the weald clays but I could not learn that any fossils are found in them.

11* ..... the subordinate sands.
12. Beds similar to the above inclined in an opposite direction
   of great thickness.

13. Large beds of these green sands between Sandown & Shankton, with
   ferruginous Sand above & I believe below them the beds of Shanklin
   -Chine wh. Bucland calls iron Sand are between these and the chalk.

15\(^1\) Lowest bed at Shanklin-Chine. These masses of Shells occur in
   concretions in the sand.

14 Upper bed at do. occurs also in concretions in an iron Sand.

I hope at some future time to be able to investigate this point more
thoroughly but I still think that if you consider these sections with the

\(^1\) Descriptions 15 and 14 appear in this order.
accompanying specimens carefully you will come with me to the following conclusions.

1. That there exists no real discrepancy between the Strata below the Chalk in the I. of W. & those in Surrey & Sussex, but that confusion has arisen from Geologists drawing the line in a different manner without declaring to the World this variance in their Classification.

2. That Webster’s Green Sand is the same as y’ fire stone of Reigate & not the same as that wh. has been styled by Conybeare, Greenough & Mantell as Green Sand in Sussex & Surrey.

3. That Webster’s blue marl is not the Weald Clay.

4. That Webster’s Iron Sand is the equivalent of that wh. has been coloured Green Sand in Greenough’s Map of y’. Counties of Sussex & Surrey.

5. That the iron Sand of the central nucleus of Surrey & Sussex does not perhaps come to the day in the I. of W. but if it sh. be found it will be in the line I have assigned it in Section A.

I believe if you assent to these inferences you will agree with me that Webster has been unfairly dealt with * (see note at end). Since he first reduced these beds to order he had a right to class them as he thought best, & if those who followed him thought fit to change his classification wh. they virtually have done (& I believe with reason) they were bound to declare that they differed from him. But on the contrary every body professes to follow him on the I. of W. Con. & Phillips copy his Sections litteration & then accuse him of blundering when in perfect consistence with his previously received arrangement, he classes the Reigate firestone as greensand & the ferruginous & green sands of Surrey & Sussex as iron S. & the weald clay as a subordinate bed.

Buckland has also surely erred in classing Shanklin Chine as iron S. & the corresponding beds (for so I take the liberty of calling them) in Sussex as green S.

But I am sorry that I must conclude. As I am just starting for Scotland
you must not answer my letter. When I return in about 3 months I will write to you again & shall be glad to hear how you got on.

With my compliments to Mrs Mantell believe me yours very truly

ChaLyell

P.S.
I inclose from Brinstead quarry some of the lower freshwater formation. How hard a rock to be younger than London clay! The silicious part almost resembles some of the Horsham.

* Note\textsuperscript{2} to [Lyell’s] page 6  [ refer to asterisk near top of page ]

I have since learnt that I was somewhat mistaken in attributing to Webster a decided priority in the nomenclature of these beds. The fact is that Warburton, in company with several Members of the Geol.\textsuperscript{1} Soc.\textsuperscript{2} among whom was I believe W.D. Conybeare, had given the name of green sand to those beds which are between the blue chalk marl and the Weald clay, during an exploring tour which they made through Sussex, Surrey, and the South of England, previous to Webster’s labours. Webster then took the term green sand already appropriated and gave it to a different bed which the others have scarcely yet discovered.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

\textsuperscript{2} This note on Lyell’s page 6 was written by an amanuensis.
My dear Sir,

If I had not been very fully occupied with the duties of my new Secretaryship in addition to my ordinary employments, you should have heard from me before. As my eyes are so weak at present as to oblige me to spare them whenever it is in my power, you will excuse my availing myself of the services of an amanuensis in writing to you this letter. Our joint paper on the G. of Sussex was referred in its regular order by the Council.

The referee, Mr. Greenough who was called upon to state whether the Society should print the memoir or not, appears to me to have paid considerable attention to it, and I was surprised to find him so well qualified for pronouncing a fair opinion on the subject. He requested me to wait on him at his house, while he went over with me the several parts of the paper, & [*] I can assure you that he has not only travelled over the greater part of Sussex & examined the Geological features of the limestone & the ironsand, but has taken very extensive views which he still retains in his memory of the general bearings of these strata thro’ the County, of their various relations with each other there, & with similar beds which appear in the Isle of Purbeck.[*]

When I asked why he had not published this information, he replied: “the view which I take of these matters is this, when any knowledge however scanty has been gained of the interior of Africa, S. America, or Canada, some advantage is gained to science by making known, since any thing is

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1 Entire letter was written by an amanuensis except the closing sentence.
2 Lyell served as a Secretary of the GSL from 1823-26. Woodward, History of the GSL, p. 296.
3 No paper on the Geology of Sussex was published in the T GSL under the joint names of Lyell and Mantell.
4 Text between asterisks is quoted in Wilson, Charles Lyell, p. 112.
better than white paper in the map, & it may be long ere we learn more; but Sussex is at our door, & it is well both for an individual & a Society to beware of publishing, what every man who has time & money to spare may immediately improve upon. We shall be much indebted to Mantell if he will work out the whole history of that interesting tract”.

Upon my explaining to him that I believed you had no thoughts of the paper being printed in its present state, he said he should therefore beg me to send it to you for further consideration. When criticising the different parts, he asked on the words “two groups”, “what does group mean in Geology?” On the words Ashburnham, Framfield, Rotherfield, Tofield &c “that cannot be, Rotherfield is quite out of the line”. He said that in the first part of the paper when published, you would of course mark out the rank in the great series of formations which the beds of Limestone & Clay hold, by reference to some system such as Conybeare’s, or the general reader will be all in the dark. He seemed to doubt your being warranted to assign to the two groups or divisions, such distinct organic remains, & upon reperusal I am inclined to think that you have run some hazard of the words “former division”, being referred to your first group alluded to above & not to Hastings, Winchelsea &c to which I suppose you allude. Greenough hinted that as no-one has published as yet an account of the Hastings beds, you will of course take care & not refer to them as if known. Has not Dr Fitton an intention to take up that ground? Greenough asked “what is between Winchelsea and Framfield?” On the words “Whether the Ashburnham limestone is situated above or below”, he observed “It is determined that Ashburnham lies under the other”. He asked “whether any of the fossils of which the drawings are annexed have been published in your work on Sussex”. On my letter on the neighbourhood of Horsham, he said, “he considered that so long a dissertation on the hypothesis of the furrowed surfaces, did not follow naturally as an appendage to the section, & that if you were not likely soon to publish a full & detailed account of the Sussex limestone in which you might insert it, it might as well perhaps be given among the extracts at the end of one of our Volumes”; & he recommended me as I seemed interested with the subject to compile a separate memoir on the theory [*] as it is a phenomenon of very general occurrence, and presenting difficulties in some

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5 Text between asterisks is quoted in *ibid.*, p. 113.
counties beyond those of Sedgwick.[*] With some of these I have myself chanced to [meet] in the old red sandstone in Scotland since I last saw you, but I will not interfere with the question if you have any thoughts of writing on it yourself; if not I shall probably make another visit to the neighbourhood of Horsham, for I suspect that many facts connected with it might still be detected which are as yet unknown.

If I accumulate several new sections there and elsewhere I might perhaps throw them into notes accompanying the essay. On my list of the localities round Horsham, Greenough observed that it was a much more concise & clearer method to throw them into a small outline map.

Would you not like to get ready an abstract of your paper for “The Annals of Philosophy”, you might take the opportunity of saying whatever you like in it & I will see that it is inserted.

Allow me to remind you that as those who have been to Purbeck say there is a gradual transition from the Sussex beds into the Purbeck, you need not seem to recant your former opinion, but merely to explain it. It must always be kept in mind that formations are for the most part arbitrary, not natural divisions.

I was glad to hear from your brother that your child had recovered from his illness.

With my compliments to Mrs Mantell believe me
very truly yours
ChaLyell

P.S. Your plates were folded and I believe injured, not my hands but I believe in Greenough’s.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

[ The following undated text was contained on a separate page ]

6 Joshua Mantell (1795 - 1865). Surgeon and writer on horticulture. DNB
7 Mantell’s eldest son, Walter Baldock Durrant Mantell (1820 - 1895).
I have laid before the table of the Society a small specimen of sediment deposited from water in the bottom of a steam boiler. It has happened accidentally in this case, that the uneven surface of the original nucleus has occasioned in miniature, a resemblance to those slabs which I have been describing. Although there is nothing singular or unusual in this instance, yet it is worth observing through how many successive layers the same inequalities are preserved, becoming however less indented by repetition and affecting that uneven surface, to which they would ultimately attain.

Some of the stone at Stammerham consisted of an accumulation of thin seams not the tenth of an inch in thickness. I may add that it will not appear inconsistent to those who are familiar with the Sea beach, to suppose at different times, furrows on the sand to take every various direction, resulting from the changes in the course of the waves, which the wind and the form of the coast produce.

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12

Charles Lyell to G. A. Mantell

29 Norfolk St. June 11th 1823

My Dear Sir,

[*]² My expedition to the Isle of White [sic] has very much confirmed the views which I before entertained of the geology of Sussex. Professor Buckland who was of the party, tho' he did not altogether give in to a theory which he admitted was new to him, was still clearly surprised, when I pointed out to him the fact, that there was every where in the I. of W.

¹ Entire letter written by an amanuensis except the closing sentence.
beds of sand below Webster’s blue marle greener than those above. [*] 3 You
are aware that Webster never found in his blue marle any fossils except 2
ammonites. At Compton Chine, however, I found several small Inocerami, I.
sulcatus, I believe, & altho’ I was only there 5 minutes, I saw so many
fragments of shells in this same blue marle, that I am inclined to believe the
identity of this bed with the blue marle of Folkestone & the Gault, might be
made out by a further search for the organic remains which it contains.

The section from Compton chine to Brook is superb, & we see there at
one view the whole Geology of your part of the world, from the chalk with
flints down to the Battle beds, all within an hours walk, & yet neither are any
of the beds absent, nor do I believe they are of less thickness than with you.
This is so beautiful a key, that I should have been at a loss to conceive how
so much blundering could have arisen if I had not witnessed the hurried
manner in which Buckland galloped over the ground. He would have entirely
overlooked the Weald clay, if I had not taken him back to see it. This clay
however is only partly exposed, the softness of it having caused a ruin of the

cliff just at the point where the Petworth marble ought to be looked for. Soon
after this Sandstone containing layers of limestone with Bivalves appears,
then some mottled beds purple & white, then Pyritous coal like that at Bex
Hill I suppose. The white sands of Winchelsea & Fairlight are magnificently
exposed [*] 4 &c &c.

I staid [sic] a day longer than the rest of the party, for the purpose of
searching in the Weald clay of the Culver cliffs section for Petworth marble,
but the cliff is there also in ruin; I found however a rounded block of it 2
feet or more in diameter on the sea shore, nearly opposite the Weald clay,
specimens from which I have brought to town, some of which are at your
service, with many specimens from the Freshwater formations which I
collected for you, & will send you when I have more leisure to pack them
up.[*] If the specimens of the Petworth marble which you were to send me
are not ready soon, I would have you defer sending them till I return to town
in the beginning of next Nov. 5

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2 Text between asterisks is quoted in K. Lyell, *LLJ-CL*, vol. 1, pp. 120-121.
3 Text between asterisks is also quoted in Wilson, *Charles Lyell*, pp. 114-115.
4 Text quoted in Wilson, *Charles Lyell*, ceases at this point, but that quoted by K. Lyell continues.
Almost the whole of the back of the I. of W. is in such a dreadful state of ruin, that I believe it has been the cause of much of that confusion, which has found its way into the heads of some of our Geologists with regard to your Sussex beds, & some of those very same Geologists whom I have heard ridicule De Luc for supposing that he had there discovered chalk beneath the Greensand.

You will be very glad to hear that Mr Warburton on whose accuracy above all men we may rely, says that above the Gault in Cambridgeshire greensand occurs as well as below it; this upper greensand as well as the firestone of Reigate, he chooses to consider as part of the lower chalk. Yet both he & Dr Fitton choose to call the beds at Beachy head Greensand, supposing it to belong to that which is below the Gault. In this they are completely mistaken.

I am going to Paris towards the end of this month; if you wish to send any presents or book or anything to any one, I shall be very happy to be the bearer of them, indeed, it will be of advantage to me, as affording me some introduction to the donees & as this visit of mine is principally to perfect myself in the language I court everything which brings me in contact with Frenchmen. I like De Beaumont much,[*] as for Brochant we have not much hopes of him, for he appears to possess anything but that locomotive disposition, which is essential to Geology, at least to this branch of it. They cannot persuade him to make any tours in the neighbourhood of London, & altho’ unwilling to take the field, he hardly possesses that knowledge which we might look for in a cabinet Geologist. He is, however, good humoured & intelligent, & would not appear as dull if he were not so deaf.

My compliments to Mrs Mantell & believe me yrs very truly

ChaLyell

N.B. I set out for Paris on the 21 st. of June.

[ Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]
My Dear Sir

I hope you have not ascribed my delay in sending your copy of Moore’s works, to my requiring your prior payment of their price. When the money arrived today I felt the reproach was no more than I deserved, but the fact is, I have deferred from day to day your packet, in expectation that I should have found time to have looked over my Paris collections, and selected from them some specimens that might have interested you. I will not however allow the opportunity to escape, of putting you in possession of those fossils which you gave me in charge, and if any should be wanting I hope I shall find them when I unpack the rest of my treasures.

I found it impossible to purchase for you any animals of the Montmartre gyps, the men are all in pay of Cuvier & some few others which we ought not to complain of as such monopolies have been heard of nearer home. I paid a visit to Prof Buckland at Oxford the other day and mentioned your Rhinoceros’ tooth of the Tilgate beds, he seemed as much inclined to believe it as if we had asserted that a child’s head had been discovered there, and he made a remark that well deserves your attention, viz. that diluvium debris with its accompanying fossils is sometimes mixed up with, and as it were introduced into the upper and exposed surface of older strata, which occurrence is not at all difficult to account for in a calcareo arenaceous bed, which would soon be cemented together again, and thus the most recent remains might be found intermingled in the same rock, with fossils of an ancient date. I do not mean to give any opinion myself as to what may be the case at Cuckfield but you should examine it with caution for Buckland enumerated to me several instances not very dissimilar in which he had been
himself deceived. You remember you made out a list of fossils found in the Blue marl of Bletchingley and the marm rock of western sussex.

I believe when I last talked with you we were pretty well agreed that there were two different beds. I mention this because some of the members of the Council when considering whether your list should be published in the extracts of our forthcoming number, but I said I would put this question to you first. A Catalogue of the fossils exclusively belonging to the blue marl of Bletchingley would be very desirable, but if [it] were confounded with the formation above, which I am well assured now is the craie chloriteé of the French, I think we might do more harm than good.

Webster does not seem to have cleared up his views of the blue marl at Eastbourne, and no wonder for so little of it is seen there that there is by no means evidence enough to force conviction on a man who is naturally very desirous not to give up the opinions which he formerly published, but in which I am well assured there are inconsistencies but I have not room at present to enlarge on this point. I shall not be able to move from London before Christmas but am much obliged to you for your invitation.

With my compliments to Mrs Mantell

believe me yours very truly

ChaLyell

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes ]

Charles Lyell to G. A. Mantell

29 Norfolk Street
London Feby.17. 1824

My dear Sir,

[*]² Your very obliging present of the Outlines of the Geology

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¹ The entire letter was written by an amanuensis except the final sentence and the Post Script
² Text between asterisks is quoted in K. Lyell, *LLJ-CL*, vol. 1, p.151.
of Lewes came to me almost as a reproach for having so long delayed sending you my letter on the Isle of Wight which I ought to have returned to you long before. \[*\] I was desirous of copying my notes because Dr Fitton wished to compare my specimens of the I. of W. with his of Sussex and Kent.

\[*\] Your little volume is a very elegant illustration of your native town and your contribution to it is an excellent proof how much the sphere of local interest is enlarged by Geology. A few years since a history of Lewes would scarcely have yielded any glimpse of information so far back as the seventh Century. The Geological Antiquarian can safely rank his treasures of the youngest date as of an age of which the builders of your old Castle had no traditionary knowledge. \[*\]

I have found since I sent you the last parcel a small additional Box which I believe was one of those which you gave me to take to Paris. It contains one of the Larch Cones if such they be on which the French would not pronounce also two detached specimens of the univalve of the Sussex marble on which I could get no opinion but unfortunately I omitted to show it to Baron Ferussac with whom I had the pleasure of being very intimate and who would have been the best authority. I hope to see him here in Town this Spring and shall therefore keep your specimens for the present.

\[*\] W.D.Conybeare is in Town and has been with us for some time. \[.\] he is waiting for the arrival of the new Lyme Regis Plesiosaurus of which he has an excellent drawing. The Duke of Buckingham has bought it, but it will be exhibited for some time at our rooms 20 Bedf. \[d\] St. \[7\] It affords a great anatomical triumph to W.D.C. as most of his hypothetical restorations in his former memoirs turn out true to nature. The new animal is a very perfect skeleton and a prodigy for it has 40 cervical vertebrae whereas existing quadrupeds range from 7 to 9 reptiles from 3 to 9 Aves reach no higher than 20 the Swan being the maximum. What a leap have we here and how many links in the chain will Geology have to supply. \[*\]

I regret that I had not an opportunity of reading over the M.S. of your

\begin{itemize}
\item[7] The rooms of the GSL were situated at 20 Bedford Street from 1816-1828. Woodward, \textit{History of}
last work before publication as your statement of the identity of the Druid Sandstone with calcaire Siliceux is unfortunate and the more so because there are so many sandstones in the Paris basin which are really analogous mineralogically speaking. Not less than three. But the calcaire Siliceux is a cherty pure crystalline Limestone containing no shells. It lies above the plastic clay as you state and although the area of its formation is somewhat problematical the best authorities incline to refer it to the lower freshwater formation. Some suppose that it is parallel to the calcaire grossiere and only found when that is wanting. My own observation would have led me to this latter opinion but Prevost who has seen more and whose opinion I would rather take than Bro[n]gniart’s, decides for the former. The two annexed diagrams will explain to you the two theories.

In the Paris basin there are three descriptions of grès or Sandstone from which hand specimens might be selected which you could scarcely distinguish from the Druid Sandstone. The oldest of these is at the bottom of the calc. gross. in those parts of the basin where the calc. Sil. does not exist. Part of this bed when full of green earth has been termed by Bro[n]gniart, Glauconia Grossin. When I arrange my French specimens I will endeavour to send you some. The second grès is an upper bed of the calc. gross. and sometimes looks very like the Bognor rock and incloses similar fossils. The third grès or gré de Fontainbleu belongs decidedly to the upper marine for I have myself seen the “calcaire d’eau douce superieure” reposing in situ upon it. But there is no sand sandstone or gré whatever belonging to the calc. Sil. I

the GSL, p. 51 and p. 73.

8 In his Outlines of the Natural History of the Environs of Lewes, (note 3), Mantell stated on p. viii, that the Druid Sandstone “is evidently identical with the calcaire silicieux of the French geologists,
subjoin an ideal section of the superposition of y/r Paris tertiary strata in which I do not enter into more details than with reference to the point on which I am speaking.

You say that the tooth plate 29. 14 is of an herbivorous animal, how do you know this? Cuvier as I understood him when searching for an analogy to it looked among the reptiles. When you mention the Sussex marble & vivipara I wish you had added that Geo. Sowerby inclines to think it turbolittorareous. He is [a] better authority than his Father in conchology which is said to be above the plastic clay".
and as Geologists we ought not willingly to admit freshwater formations there.

When you happen to be sending a parcel to town small Slabs of Sussex marble with moderately sized specimens in a rough state with the shells standing out in relief will always be acceptable to me if you will have the goodness to charge me with the expense of polishing.

Our new Vol.\textsuperscript{9} is in the press and as Sec.\textsuperscript{7} I am too busy to look over my foreign specimens or I would have continued to find you some duplicates.

With compl.\textsuperscript{5} to Mrs Mantell believe me yours most truly

ChaLyell

P.S. Read my new note to I. of Wight letter.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes ]

15

Charles Lyell to G. A. Mantell\textsuperscript{10}

29 Norfolk Street. Strand.

20 th. April 1824.

Dear Sir,

I send you a small packet of specimens one suite of which viz that from Shine I recommend first to your notice although I was doubting

\textsuperscript{9} TGSL, 1824, I (2), series 2.
\textsuperscript{10} The entire letter was written by an amanuensis except the final sentence.
whether I had not already sent you specimens from that place[.] they are put up together in one parcel and I enclose the section to which they belong. They are of importance as proving that Guildford does not as some have supposed form an exception to the general rule and that the ironsand of the green sand formation does not there meet the chalk without an intervening bed of blue marl and of chlorite chalk resembling the under-cliff. The other specimens from the I. of Wight will possess the advantage that they were all collected by myself with great attention to Geological position. There are no beds where this is more necessary or from whence specimens collected by the uninitiated would be more totally worthless.

The rocks which come from the grand section of the lower freshwater near Bembridge were I believe never examined with so much attention as I gave to them and although I cannot send you a suite of the fossils of these beds yet it will be something to possess specimens of the rocks in your collection which nature manufactured at a period evidently subsequent to the most recent which you have seen in your County. As I have explained each specimen on the ticket which is enclosed with it it will be unnecessary for me to trouble you with any more in the latter. I hope that in looking over my collections from Paris that I shall find duplicates which will serve as equivalents to the I. of Wight formations. [*]

11 I ought to observe that there is a remarkable and somewhat unaccountable discrepancy between the beds of the lower freshwater formation at Headon Hill and the same beds at the eastern side of the Island between Bembridge ledge and Culver Cliff [*] from whence I have sent you a section. The numbers 1.2.3.4.5.6 which you will observe are attached to the labels refer to this section of which I have sent you a copy because there is no accurate published account of the Whitecliff Bay freshwater beds.

believe me My dear Sir

Yours truly

ChaLyell

11 Text between asterisks is quoted in Wilson, Charles Lyell, p. 126.
Section presented by the Cliffs near Benbridge Ledge, Isle of Wight, at the junction of the horizontal and vertical strata in White cliff Bay.
My dear Sir

[*] The three letters which you have sent me & which are still unanswered arrived in town when I was absent on a tour with Mons. Constant Prévost a French Geologist whom you know from his works.[*] We travelled by Oxford, Dudley, Malvern, Gloucester, Tortworth, Bristol, Exeter, Cornwall, Plymouth, Lyme Regis, Weymouth, Isle of Portland &c [...] a most interesting Geological Excursion.

One of your letters was sent after me en route, the other two were forwarded to this place & I now receive them on my return.

[*] I am glad you are persevering in enriching your collection which is becoming generally celebrated & will be soon more well known since the visit of our Oxford Professor who was very much struck with it.

My friend Prévost studied anatomy for 3 y. under Cuvier, & as he is intending to visit England again this summer he will if possible call on you at Lewes. I gave him your address & assured him that he would meet with a welcome from you. It would be of use to his Geological work on Normandy to see your fossils & I doubt not you will derive much light from his remarks on

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1 Text between asterisks is quoted in K. Lyell, *LLJ-CL*, vol. 1, p. 153.
2 Text between asterisks is quoted in *ibid.*, p. 153.
Three weeks since a magnificent specimen of an ichthyosaurus (tenuirostris?) was discovered at Lyme by the celebrated Mary Anning. It is about the size of the Plesiosaurus which you saw in Town. M. Prévost took a drawing of it which I have traced, & I send it you that you may see it as it will be long probably ’ere it is published. The sketch was taken by measuring & altho’ rapidly, yet may be depended upon.[*] If you are sufficiently interested with it pray copy it & send mine back to me “to the Geol.¹ Soc.y London” that I may have it when I pass thro’ town in 4 or 5 days on my way to Scotland.[*]² While we were at Lyme we witnessed the discovery of a superb skeleton of Icth. vulgaris by Miss Anning. It was perfect, save the tail, wh. a cart wheel had passed over. It was 2 f.¹ long. [*]

I will enquire whether Cuvier which you speak of is at the Geol.¹ rooms & if I have time try to borrow it for you.

I hope Mrs Mantell is recovered & believe me yours very truly

ChaLyell

July 9 1824
Southton Bartley Lodge

P.S. You will remark the minuteness of the largest tooth of so large an animal.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

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¹ Text between asterisks is quoted in K. Lyell, LLJ-CL, vol.1, p.153. Most of this extract is also quoted

Charles Lyell to G. A. Mantell

[ 24 November 1824 ]
My dear Sir

I have been absent from town first on my tour with M. Prévost & afterwards in Scotland, ever since the end of May. I find a letter of yours waiting me here to which I need not now reply & have only to hope that you suffered no material inconvenience in the preparing your publication in consequence of my not being on the spot. Is your work out? Am I among the Subscribers? if not I intended it & beg you will put it down as a matter of concern to every work with which you favour us & the more the better. You have seen Dr. Fitton’s paper in the Annals of Phil. on the old story of the firestone, gault, & greensand. You will also be struck with the concordance of all the opinions there (except one or two blunders to wh. he pleads guilty) with those which I detailed to you in my long letter of July 1822. Dr F. had seen that letter & kept it 3 weeks in order to copy it but had so completely forgotten it & all the other circumstances which I had told him of these matters that he has been discovering them all himself in the I. of Wight. You will see however a handsome acknowledgement of my claim to priority in the number of the Annals which comes out tomorrow which I did not want him to publish but both he & Bucland thought it right. I regret much now that that you had not published in some of your works 2 y. ago all that we both knew on this lead for it would have done you much credit which has been now preoccupied but you will be satisfied with me that the confusion which we have long felt is at length in a fair way of being cleared up & the truth of being known.

Fitton has said something of you too & what with Bucland’s Megalosaurian compliments & some that were paid you at our last discussion you will have come off moderately well.

[*] I have made a very detailed Geol. Map of 2 thirds of the county of Forfar. this year besides many more labours on rock marl, serpentine &c

in Wilson, Charles Lyell, pp. 128-129.
5 Mantell’s next work, Illustrations of the Geology of Sussex: The Fossils of Tilgate Forest, Lupton Relfe, London, was not published until December 1826.
7 On February 1824 Buckland read his ‘Notice on the Megalosaurus or great Fossil Lizard of Stonesfield’, TGSL, 1824, 2(2), series 2, pp. 390-396. In doing so Buckland favourably commented on Mantell’s fossil discoveries and highly valuable collection at Lewes.
8 Text between asterisks is quoted in Wilson, Charles Lyell, p. 131.
[*]. I also made a 5 weeks tour with Bucland in the North of Scotland. I hope to see you in town soon to talk over my travels with you.

With my comp.¹ to Mrs Mantell yours very truly

ChaLyell

29 Norfolk St.
Strand
Nov.¹ 24, 1824.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes ]

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18

Charles Lyell to G. A. Mantell

[ 8 January 1825 ]

My dear Sir

The Secretaries of the Geol.¹ Soc.² were requested by the Council to make out a list of such papers as had been read, with a view of going to press as soon as possible with a new number, to redeem our character if possible after the delay last time. Among others “Mr Mantell on

¹ T. Webster, 1819-17, C. Lyell, 1823-26, and P. B. Webb, 1824-25, were the then current Secretaries of the GSL. Woodward, History of the GSL, p. 296.
the Iron-Sand of Sussex”\textsuperscript{2} appeared in the list as one referred to Mr Greenough & not reported on by him but still in the hands of the Author. I was asked about it & said that I would communicate with you on the subject, thus leaving it open to you to get anything ready if you like before our next meeting of Jan\textsuperscript{y} 21. You would have been surprised to see how many papers stood before yours but really the Socy’s Council are not to blame, for even those worth publishing are in such a state that it requires much more time for a referee or Secret.\textsuperscript{y} to prepare them than he w.\textsuperscript{d} take to make a new paper himself.

I have just been reading a longish paper of mine entitled “On a recent formation of freshwater rock marle in Forfarshire (Scotland) with some remarks on the origin of shell marle.”\textsuperscript{3} I was much flattered with the manner in which the memoir was received & discussed. If it is ordered to be printed I fear it will not come into the next number for those papers only are to appear in that which are ready by our Anniversary and as each is of course entitled to priority in the order they were read & the number of pages is to be limited to 200 I fear that number will be occupied before my turn. If you can give me any hints on shell marle I shall thank you as I could put them in before the referee gets my paper next week. I know you have not neglected alluvial deposits near Lewes for which I have quoted you. The following are some of the leading points on wh. you may have some opinions.

1. Is shell marle entirely derived from shells? if not why does it abound in a part of Scotland in wh. limestone is almost unknown, & is wanting in the Chalk & Oolite tracts of England?
2. Is there marle deposited by water in the Chalk?
3. In alluvial valleys in Chalk, in wh. freshwater shells occur, does calcareous marle accompany them?
4. Testacea multiply excessively in Scotland in the clearest lakes. when the water is charged with too much lime, as is perhaps the case in Chalk countries are not the mollusca killed, or injured?
5. If marle be derived from shells, why does it not form in England where I

\textsuperscript{2} G.A. Mantell, ‘On the Iron Sand Formation of Sussex. In a letter to Dr Fitton, Secretary to the Geological Society’, [14 June 1822], TGSL, 1826, 2(1), series 2, pp. 131-134.
\textsuperscript{3} C. Lyell, ‘On a recent Formation Of Freshwater Limestone in Forfarshire, and on some recent Deposits of Freshwater Marl; with a comparison of recent with ancient Freshwater Formations; and an Appendix on the Gyrogonite or Seed-vessell of the Chara’, [1824], TGSL, 1826, 2(1), series 2, pp. 73-96.
am told shells lie a foot deep at the bottom of ponds, as at Deptford?

6. If marle be a mechanical deposit from water ought it not to be **most abundant** in calcareous districts in England, & **least**, in the old red sandst. of Scotland in wh. there is scarcely any carb.¹ᵉ of lime? yet **there** it is accumulated enormously.

7. If marle be a chemical deposit from water why is it rare in England where evaporation is greater, where tuffaceous incrustations are common which are entirely unknown in the part of Scotland in wh. marle abounds?

8. Again, if it be chemical, why does its formation entirely cease in Scotland when a lake is drained, tho’ the springs wh. bring up calcareous matter, still flow?

9. Do canals in Chalk countries fill up with a kind of marly matter?

10. Near Romney in Hants. I have found a large quantity of shell marle in the alluvial tracts, **overlying peat**, wh. comes near to the Scotch. It is in the plastic clay formation. Do you know any English localities?

11. Is marle ever found where there are no springs?

12. Do freshwater testacea live in ponds in Chalk?

With my compl. to Mrs Mantell & with the hope of hearing from you soon believe me

yours very truly

ChaLyell

29 Norfolk St.
Jan 7. 8. 1825.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]
Charles Lyell to G. A. Mantell

London Jan 14  1825.

My dear Sir,

I am much obliged to you for your answers to my queries which are quite in print¹. Warburton tho' he seems to have assumed in his former paper² the animal origin of the shell-marl in Scotland, has now changed sides & thinks a large part very probably a deposit from water. On the contrary I think I can prove that in Forfarsh. it is derived exclusively from testacea. There is much to be said on both sides. Nothing is so difficult to account for as that there is so little marl in Chalk or oolite countries. indeed is there any? Bucland can tell me of none. Your pipe clay interests me much. Do you know any facts with regard to decomposition of shells in alluvial deposits or in ponds? or ditches? I am in hopes that in thinking over some of my queries you may be led to some observations that may assist me for I shall endeavour thoroughly to go to the bottom of the subject which I find deepens as I attempt to fathom it. Your clay with turbo ulva is exceedingly pretty. it reminds one of some clay of the upper marine in I. of Wight enclosing shells.

Warburton has undertaken to prepare the iron sand paper for the press therefore pray send it & I will see about a note which shall assert the date of your communication of the Iguanodon tooth. I cannot agree with you that Mr Webster’s or any paper since read have superseded the facts in yours. Yours should have been published as a notice in the last vol. but Greenough’s reason for not recommending it was, that the facts were after all but a scanty

¹ There is no acknowledgement of any assistance which Lyell may have received from Mantell in Lyell’s published paper, ‘On a recent Formation of Freshwater Limestone in Forfarshire’, TGSL, 1826, 2, series 2, pp. 73-96.
contribution towards the history of a bed so near home & so accessible that he could not persuade himself that you could not with care render it much more full & that it would then be more valuable both to science & your fame. He was perhaps mistaken but it was done with the best intention & was the sole reason of the papers publication being deferred.[*] Konig tells me he has no fear of your becoming F.R.S. What I can do, I will.[*]

You must not decline being on our Council from your incapacity to attend it. It is a compliment which is thought the more due to you from the laboriousness of your professional engagements which make your exertions in Geology the more meritorious, at least in the eyes of every lover of that Science. yours truly

ChaLyell

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

20

Charles Lyell to G. A. Mantell

[ 19 May 1825 ]

My dear Sir

Relfe has been here today & showed me your letter. Dr Fitton gave me (& said he sh. d write to tell you of it) some days since the Rhinoceros horn 4 & another bone, which I took to [Shouts?] & he promised in a week to do them.[*] I have shown your other new & interesting Tilgate

3 Text between asterisks is quoted in Wilson, Charles Lyell, p. 143.
4 The ‘rhinoceros horn’ was described by Mantell as “a very remarkable appendage, with which there is every reason to believe the Iguanodon was provided. This is no less a horn, equal in size, and not very different in form, to the lesser horn of the Rhinoceros.”, G.A.Mantell, Illustrations of the Geology of Sussex, Relfe, London, 1827, Plate XX, figure 8. After Mantell’s death in 1852 the ‘horn’ was shown to have been a claw. Spokes, G.A. Mantell, pp. 26-27.
5 Text between asterisks is quoted in Wilson, Charles Lyell, p. 142.
fossils to Stokes, G.Sowerby, Dr. Woolaston [sic], Konig & others. All declare that it is new, remarkable & unintelligible & therefore may be what Mr Mantell chooses & I informed them that you wished it to be an insect. Dr W. says “it shall be an insect”.[*] As the Spartans of old decreed “quoniam Alexander Deus esse vult est Deus”. 6

Konig made a miserable wax cast of it with which dissatisfied I took to [Sarte?] who promised to make a chef d’oeuvre of it in 5 days. I ordered a dozen, in plaster of Paris, & have got back the original safe. It was as much as I could do to prevent the learned from trying their skill in cutting away more of the matrix.

I am wicked enough to rejoice that the growing taste for organic remains makes you pay dear for them at Lewes. You must be satisfied with the monopoly of the Tilgate gold-mine. If Bristol had been as near as London there would have been long ere this a joint-stock Company formed for working it.

As I am busy I cannot write a longer letter but write to me if I can do anything for you here.

yours most truly
ChaLyell

29 Norfolk St.
May 19, 1825

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

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6 “because Alexander wishes it to be God it is God”.
My dear Sir

I send Relf[e] 3. models of the horn & 3. of the bone to do with them as you may have directed. [Shouts?] c. not get them done before this morning. I keep 2. of each here because I thought you might hereafter wish me to give them to some one in town. I send also the two originals. I shall retain the Tilgate Entomolite, tho’ I have shown it now to so many that I am sure nothing will be made of it. Macleay\textsuperscript{1} has not seen it yet.

The models are not yet come from [Sarte?].

Our general Meeting & dinner to celebrate the Charter is to take place on next Frid.\textsuperscript{y} week on the ordinary meeting day. Can you not come?

I am so busy that you must excuse a short letter.

yours most truly

ChaLyell

29 Norfolk St.

May 23. 1825.

P.S. I forgot the Juli & univalves unless they are those I took to Paris? I will search at 20 Bedf.\textsuperscript{d} St. in my Paris box for them but cannot send them today. If I find them I can send them with the entomolite.

\textsuperscript{1}It is more likely Lyell refers to William Sharp Macleay (1792-1865), natural scientist and entomologist, rather than Alexander Macleay (1767- 1848), entomologist and colonial statesman. DNB. Both men were in England in May 1825.
My dear Sir

[*]¹ I went to Fitton’s when he came to town for a few days in the beginning of this week & was not a little gratified at being there when the Clathrarium,² my namesake, was found.

You might have felt secure that so beautiful a specimen as it really is, would never have been thrown away even by mistake at the house of a Geologist. Though I did not see Chantrey³ about the Iguanodon’s teeth yet I have no fear of their safety & they will at length in his hands like the teeth of Cadmus’s⁴ dragon, be productive of a fruitful crop.

Fitton has promised to enquire about them. He has just returned from examining the “valley of Elevation” as Bucland calls it at Highclere which I consider as caused by a continuation of that Elevating force which acted in a line along the central axis of your great saddle of Surrey, Kent, & Sussex, & which if prolonged w.⁵ have elevated the firestone beds (for such they prove to be) at Highclere.

All this took place after the deposition of the London clay; & before it happened the Plastic & London clay of the Hants & London basin were horizontally connected. The Chalk which now separates them was pushed up thro' them, for as Bucland observes, the highest chalk summit at Inkpen Hill is still covered by decided Plastic clay.

Your great valley is not a valley of denudation. I do not agree with Bucland that much chalk has been carried away, between the N.⁶ & S.⁷ downs for as two sides of a triangle must be longer than the base, so when the horizontal chalk was inclined from below London to the N. downs, & again from Lewes to heaven knows how many miles under the Sea, how could

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¹ Text between asterisks is quoted in K. Lyell, *LLJ-CL*, vol. 1, pp. 160-161.
⁴ Greek mythological figure who slew a dragon, had its teeth sown in the ground and saw them grow into armed men.
there be other than an opening of some miles? [*] Some little was washed away between b & c.

The chalk in the I. of W. & Purbeck became vertical at the same epoch that your Sussex valley was formed & was the effect probably of a continuance laterally of the same force, causing waves. Alum Bay proves that in the I. of W. it took place after London clay was deposited.

[*]^5 I remain here for a month or more & perhaps may go to Dresden to learn German this Summer or rather autumn but I am not sure.

Buckland you know is made by Ld. Liverpool^6 a canon of Ch. Ch. a good house, £1,000 per an. & no residence or duty required. Surely such places ought to be made also for Lay Geologists. with my compl. to Mrs Mantell

believe me yours very truly.[*]

ChaLyell

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

23

Charles Lyell to G. A. Mantell

[ 3 Nov. 1825 ]

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^5 Text between asterisks is quoted in K. Lyell, LLJ-CL, vol.1, p.161.
My dear Sir

I only arrived in town last night where I found your letter. I quitted London for Hants at the same time as Stokes & Chantrey whom I saw here somewhat in doubts as to making you a visit, & urged them much to do so, knowing that it would be of advantage both to them & to you & to Geology. I am glad you saw them.

I cannot learn whether Bucland is to be here tomorrow, indeed we seldom know till within a few hours of the meeting, but Webster tells me that Ad. Bro[n]gniart is to attend the meeting which will I hope be a sufficient inducement to you to give us your company.

As I read a paper of Fitton’s on New Holland\(^1\) compiled from Capt. King’s\(^2\) notes & specimens your intended present will perhaps make a greater show at some future meeting, besides we shall I suppose not be quite in full force.

Your present of a coloured copy will be most acceptable to the Soc.\(^3\) it is a desideratum which was once regretted at the Council but our small book-fund was thought at too low an ebb to purchase. I will enquire about a French Dictionary.

I was much interested with your discovery of the horn\(^3\) which Stokes convinced me was right. I have so little time to prepare for the meeting tomorrow the paper being in an unfinished state, & still more the maps that you must excuse a short letter which I hope you will get in time to come. If you come breakfast with me Sat.\(^7\) morn.g & I will get Bro[n]gniart to visit you. With my comp.\(^{18}\) to Mrs Mantell yours very truly

ChaLyell

29 Norfolk St.

Nov. 3 1825

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Charles Lyell to G. A. Mantell


\(^2\) Philip Parker King (1793 - 1856). Royal Naval officer who surveyed the Australian coast 1817-22. *DNB*.

\(^3\) See note 1, Letter 20 (19 May 1825).
My dear Sir

As the Post will go out before we know whether you come I will not run the risk of losing a day without writing to say that Ad. Bro[n]gniart whom I saw this morning will not be able to visit you. He begs me to say that he is extremely sorry as one of his great objects in visiting England was to make your personal acquaintance. He leaves England in about a week. Wishes to see all your drawings of fossil plants, to show you his magnificent collection made in England, to talk over these with you. Hopes you will bring up all your drawings & portable specimens of plants. Pray come. Bucland will be here I have just heard, & stays 3. or 4. days in town.

Yours ever most truly

ChaLyell

Fridy. 29 Norfolk S¹
1825

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

25

Charles Lyell to G. A. Mantell

[ 10 Dec. 1825 ]

Dear Mantell

I am going to send to Ad. Bro[n]gniart before I leave town which will be about Saturday next, Dec. 17,th & will enclose any thing you
like. I shall probably be at the R.S. on Thursds.⁷ I asked D. Gilbert for a frank the night of your election at which I was present, but as he assured me he would write himself, I felt it unnecessary but beg most heartily to congratulate you.⁴ I think if you brought up your packet with you it would do very well.

in haste believe me
yours most truly
ChaLyell

Athenaeum

[ Addressed to: Gideon Mantell Esq. Lewes, Sussex ]

26

The following letter, dated 7 February 1826, was written by William Buckland to Charles Lyell who added his own comments and then sent both letters to Mantell on 9 February 1826.

[ 7 Feb. 1826 ]

My dear Sir

In Reply to your Questions arising out of Mr. Mantell’s Letter, I have to observe:

1. Is not the Term Malm applicable, rather to Chalk Marl, than to Firestone?
Ascertain this by reference to the Counties where the term Malm is provincially used. I believe Smith will furnish this Information.

2. I would certainly retain the term Firestone to express the Ryegate & Merstham Beds, and I would add to it, as a Synonymet, “Upper Green Sand.”

⁴ Mantell was elected a Fellow of the Royal Society of London on 25 November 1825 and admitted on 22 December 1825 when he was introduced by C. Babbage and J. Herschel. GAM-PJ.
or, Merstham & Ryegate Beds”.

3rd To the term Galt, I would add “or Folkestone Marl” & exclude the Term Blue Chalk Marl as belonging to the Bed wh. is burnt at Guildford for underwater Lime.

4th I object to the Term Blackdown Sand, because there are so many Hills of that name, and, who for a work on Sussex, would advise the Adoption of “Haslemere & Leith Hill Sand”, or Lower Green Sand.

5th I approve the Term “Hastings Sand”, but object to the Term “Forest”, unless “Tilgate” or Ashdown be prefixed to it, or both.

6th Are not the Ashburnham Limestone Beds to be referred rather, to the Purbeck Limestone Beds, not the Marble, than to the Hastings Sand?

Moreover, I would refer my Readers to the Section presented by the Hills, immediately, on the North & South of Godstone, as one of the most obvious and unequivocal on the line of any of the Public Roads, and, as being that which is published by Smith in his Sections, in its true and proper Order of Succession.

7th I hope you mean to vote for Mr. Estcourt 1 against Sir Charles Wetherell, 2 & if you have not already done so, will give me Authority to mention your Name to the Committee.

8th Dr. Bostock 3 has, with his characteristic modesty, consented to accept the Office of President, if it be deemed for the Benefit of the Society that he should do so; his Conduct on the Occasion has been most handsome. I have written to De la Beche & desired him to send his Reply to Mr. Webster.

I hope to be in Town on Saturday, but regret I shall not be able to come to the Council on Friday, therefore make my Apologies, & believe me, very truly Yours,

Wm Buckland

Feb. 7. 1826

[ Addressed to: C. Lyell Esq. Norfolk St. Strand, London ]

Letter from Charles Lyell to G.A.Mantell written on the

1 Thomas Henry Sutton Sotheron Estcourt (1801 - 1876). Conservative statesman. M.P. for Devizes 1805-27 and for Oxford University 1827-47. DNB.
remaining space of Buckland’s letter to Lyell.

[ 9 February 1826 ]

Dear Mantell

I only received your letter about a week ago when I returned to town & have immediately attended to it. Dr. Fitton sent me his paper & appendix published in ‘Annals. of Phil’, but as you read them I suppose need I send them to you, but if so how? I shall now offer some remarks first observing that I agree with all Bucland’s particularly with N. 4. 5. & 6.

1. Chalk with flints is better than Upper Chalk.

2. Chalk without flints much preferable to Lower Chalk. Middle Chalk w. be more appropriate but pray avoid new names. “Lower” sounds as if the whole Chalk was divided merely into upper & lower & not that a great bed of true genuine chalk was still lower, than the Lower Chalk. Chalk Marl is established.

3. The greatest objection to malm-rock is that malm in Hants is applied to friable shell marle & elsewhere to soft malm-lands. Besides how badly it applies to loose beds of green sand as at Beachy H.? 4. Blackdown sand is bad for more reasons than Bucland & Fitton have given you but I have not room to add more & it is not necessary. Weald clay, good – Hasting sands best alone & by all means no “Forest”. 5. Galt or Folkstone marl will do very well. Shanklin or Lower green-sand may perhaps do tho’ I cannot make up my mind about that. You must use your discretion. The Ladies & Lovers of the picturesque have always attached romantic associations to Shanklin Chine & we ought not to allow ourselves to be laughed out of it because some people’s associations are ludicrously opposite.

Yours most truly

3 Dr. John Bostock (1773 - 1846). Physician who moved to London in 1817 and abandoned medicine for general science. Elected President GSL 1826. DNB.
4 Postmarked 9 February 1826.
P.S. I was made F.R.S. on Thursd. last.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

27

Charles Lyell to G. A. Mantell

[ 27 February 1826 ]

My dear Sir

I enclose you a note which was I believe the last our Ex.Pres.t wrote in London or rather “caused to be written”. I hope the opinion is a just one as I believe it agrees with your conjectures?

The bearer of this, Sir A. Crichton, you know of course by name as V.P.G.S. & no doubt by reputation as a Geologist. I feel therefore that it is quite unnecessary for me to mention him as a friend of mine to ensure him your attentions when at Lewes where I am in hopes he will go expressly to see your collection.

I hope you got my letter & Fitton’s. I think you had better leave alone Murchison’s favourite “upper green sand”. Green S. if kept at all should be the name of the whole formation & that merely as an old name & not for any better reason. I have given up the G.S. & am working at Law. As S.A.C. has

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2 Sir Alexander Crichton (1763 - 1856). Scots physician and amateur geologist. Vice-President GSL, 1826. DNB.
3 Sir Alexander Crichton.
given me but short notice I must conclude hoping most sincerely to hear from him when he returns that your domestic anxieties are over. I am happy to inform you that I am F.R.S.

with my comp.ts to Mrs. Mantell believe me

yours very truly

ChaLyell

29 Norfolk St.
Feb. 27 1826

[Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]

28

Charles Lyell to G. A. Mantell

[ 11 March 1826 ]

My dear Sir

I enclose Dr. Fitton’s supplementary paper¹ which you say you have not read. As soon as my paper² is printed I will endeavour to get you a copy for I fear you may wait forever if you stay till the vol. is out. I hope it will be printed very shortly. I should like you to see it before you publish. Murchison has I believe written to you.

Did you ever find granite pebbles or fragments of any primitive rocks besides quartz in the Tilgate beds? Might not some of the quartz pebbles in the Diluvium of London have come from that bed? Do you ever find chalk flints along the central ridge of Sussex, or “the anticlinal axis[”] as Scrope has it? Are not chalk flints rare between the escarpments of the N.& S. Downs compared to their abundance on the S. side of the S. & N. side of N.

² Lyell presumably refers to his paper, ‘On a Recent Formation of Freshwater Limestone in
Downs? What pebbles besides those derivative from chalk occur in the latter diluvium? Are you not of opinion that the diluvium of the S.W. part of Sussex is partially of a local character?

These are queries which a paper I am now writing on the Plastic clay between Xch. Head Hants & Studland Bay, I. of Purbeck have suggested.³

Dr. Bostock is our new Pres.⁴ Greenough might have been if he had wished it. But I suppose Sir A. Crichton has told you all the news.

With my compl.⁵ therefore to Mrs Mantell I will conclude in haste yours very truly

ChaLyell

29 Norfolk St.
Strand. March 11. 1826

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

29

Charles Lyell to G. A. Mantell

[ 2 April 1826 ]

My dear Sir

By your letter receiv.⁶ today I presume that Mr Relf[e] has not forwarded you my last letter as you do not allude to it.

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I hope you have not lost a letter a long one which I wrote to you on the subject of the greyweathers &c & their equivalents in [y'] Paris Basin.\footnote{CL to GAM, 17 February 1824, \textit{[ Letter No. 14 ].}} It contained much more information than I can now give as it was extracted from my Geol.\l Memor.\textsuperscript{dum} Book which fell into the sea from Highcliff last summer.

It is dangerous to talk of equivalents between any beds in the 2 basins younger than the Plastic clay. Perhaps there was a communication up to that formation & then the seas must have been separated & no mineralogical resemblance again occurs. The Fossils of the Calc. gross. are similar owing perhaps to the similarity of Epoch, but in other respects the Calc. Gross. is no more like Lond. Clay than the Oolite. There are three grés in the French Basin like the Druid sandst., one is between the Plastic clay & Calcaire grossiere, the 2.\textsuperscript{d} is in the upper part of the calcaire Gross below the Gypse or Lower Freshwater. The 3.\textsuperscript{d} is the upper marine formation of which there is a grand display in the Forest of Fontainbleu where they stand out like our greyweathers.

The sands of the Plastic Clay near Studland near their junction with the Chalk of I. of Purbeck on which I have lately read a paper\textsuperscript{2} pass often into sandst. Query, would fragments of these rounded & left by a debacle have resembled the fragments on the S. downs?

I will send C. Prévost’s Paper on the Gres de Beauchamp in which you will see the 3 grés ment\textsuperscript{d} & hope Relf[e] will find an opportunity of forwarding it. But do not attempt to assimilate in such details the totally dissimilar formations of London & Paris.

2.\textsuperscript{dly} The Craie chlorité is our Firestone.

3.\textsuperscript{dly} The Craie Tufeau is not our chalk marle, at least it appeared to me that they never called it tufeau till it began to get micaceous & in part to be passing into firestone.

4. I would certainly include Firest. in the Chalk form.\textsuperscript{n} & it is hard to exclude Galt, in this case it seems a pity that the Shanklin beds are left to stand alone as they unquestionably belong more to the former series than to the Weald C. & Hastings & Purbeck. The Shanklin w.\textsuperscript{d} not do with the chalk & are not enough for a group by themselves.

I start for Sessions tomorrow morning at 7 o'clock A.M. & find a moment to scrawl this with difficulty.

Let me see Prévost's memoir again some time or other when you send to town.

Yours very truly

ChaLyell

9 Crown Office Row
Temple

Apl. 2. 1826

[ Addressed to: G. Mantell Esq. Castle Place, Lewes ]

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Charles Lyell to G. A. Mantell

[ 16 May 1826 ]

My dear Sir

As I know not that I may see Fitton for several days to ask him about Pewsey & Devizes (neither of which I can answer myself tho' I believe your conjecture is right), I will write at once and thank you for your specimens, & now that I am [*] in Chambers, fixed in my own house,[*] I will have a small collect. arranged & am glad of so beautiful a beginning. Warminster is now settled to be firestone. I have been writing a chapter addressed to the general reader on “Freshwater Formations” as an appendix to an account of Hordwell cliff which I have now examined in minute detail.

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279-286.

3 In early April 1826 Lyell moved from 29 Norfolk Street to larger rooms at 9 Crown Office Row, Temple, Wilson, Charles Lyell, p.148.

4 The reference to the Vale of Pewsey, to the east of Devizes, concerns the nature and causes of seemingly simple valleys of denudation and relates to Buckland's paper 'On the Formation of the Valley of Kingsclere and other Valleys by the Elevation of the Strata that inclose them; and on the Evidences of the original Continuity of the Basins of London and Hampshire', [1825], TGSL, 1829, 2, series 2, pp. 119-130, on p. 123.

5 Text between asterisks is quoted in Wilson, Charles Lyell, p.148. The context refers to Lyell’s
as you will perceive hereafter. It will appear in a small Christchurch Guide
which my friend W.S. Rose\(^6\) is going to publish for the benefit of our Hants
fashionable watering place dilittante savons.\(^7\) I have pronounced as Fitton
stated, (see Ann. Phil. Nov.\(^7\) 1824)\(^8\) That if a line be drawn between the
Weald C. & Shanklin S.\(^4\) all above to chalk and further is marine all below to
Portland freshw'.\(^4\)

As for the beds of oysters found in the Weald clay (query where?) and
in the Purbeck I contend there are no more objections in so great a thickness
of freshwater (800? feet) than the oysters of upper marine I. of W. occurring
in the 200 ft. wh. the united Lower & Upper Freshwat.\(^5\) scarcely exceed. The
oysters of Weald & Purbeck are accord.\(^8\) to Sowerby, genuine marine shells.
As to the whales of Tilgate, two whales have been found in the freshwater
alluvial deposits of the Firth & one was stranded last year near Hamburgh,
having mounted the Elbe in a storm. As to the Sharks teeth of Tilgate (query
if sharks?) what can be said? I attribute the oysters to the minor oscillations
of the land lifting up & depressing the estuary alternately, the grander
alternations arose from extensive earthquakes. You will be out long before
me & mine will not be a scientific thing but anonymous, I hope amusing.

\[^8\] Do not conceal any evidence of marine in the Tilgate, indeed this
you will not I know, but do not throw it in the shade. All will come right, &
it is a freshwater formation undoubtedly & the grandest discovery in Geology
since Cuv. & Brong.\(^10\) came out. If in an estuary it must still have been
above the mean level of the sea. How stupendous a conclusion with respect to
beds below the chalk so widely extended a formation! [^\]

I am much hurried & wish you were here to tell you all I have been
doing on this lead. If you do not come this season I will try to write again. If
you doubt about any freshwater shells of this group, send them here &
J. Sowerby\(^11\) shall give his opinion. Send me any further proofs you possess

\(^7\) Text between asterisks is quoted in Wilson, Charles Lyell, p. 151.
\(^8\) W.H. Fitton, ‘Inquiries respecting the Geological Relations of the Beds between the Chalk and the
Purbeck Limestone in the South-east of England’, Annals of Philosophy, 1824, 8, pp. 365-383 and
458-462.
\(^9\) Text between asterisks is quoted in Wilson, Charles Lyell, p. 151.
\(^11\) James de Carle Sowerby (1787 - 1871). English conchologist and artist. Son of James Sowerby
(1757 - 1822) DNB.
You know that Webster in Sir H. Engle.¹ I. of W. letter 9th p. 192. & p. 237 pub.¹ 1814,¹² wondered that the freshwater beds of Purbeck containing limnaea & Planorbes had not attracted more attention. See also Sowerby’s description of Pl. 31 Min Con.¹³ publ.¹ in 1813 on cipris & vivipara below chalk.

Soc. Trans. will be out in 3 weeks. I expect your notice¹⁴ in. I heard to be in. I have not heard from Ad. Bro[n]gn¹. James Sowerby has acquired great knowledge of freshwater shells & is always working on them. Avail yourself of his willingness to communicate it.

I prize your considerable pebbles from the Brighton Diluvium. Your accident was frightful¹⁵ & I sincerely hope will not be hereafter troublesome. Excuse my hurried scribbling hand.

Yours very truly

ChaLyell

P.S. I spend the whole day in the courts of Westminster. Your observation on the absence of ammonites &c is most important & new. Speak out & fearlessly your opinions & the World will do you justice. However, the daws may peck a few holes[.]

May 1826

¹⁵ There is no mention in Mantell’s Private Journal of any accident he incurred at this time.
[ Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]

31

Charles Lyell to G. A. Mantell

9 Crown Office Row
Temple.
June 22 1826

My dear Sir

[*]¹ I much regret missing you, particularly as I had just got a copy of my paper ready for you. I live near my old rooms.

Do not talk of the G.S.[*] Between ourselves I have washed my hands of them. As long as Webster² takes a passive lethargic part & Greenough an active part in these concerns [*]³ as long as Warburton⁴ allows the whole to rest on his sole shoulders, & has a large mercantile business & a hundred other hobbies besides the principal one, the London University (to which is now added M.P. for Bridport) so long publication or real utility is out of the question & a secretary might as well try to bring about reform, as Warburton in his new capacity to throw open all the rotten boroughs. But enough of this; I must not spot radical as [*]⁵ I am become a Quarterly Reviewer.⁶ You will

¹ Text between asterisks is quoted in K. Lyell, LLJ-CL, vol. 1, pp. 164-165.
² T. Webster was a salaried secretary GSL 1819-27 and a joint secretary with Lyell 1823-26. Woodward, History of the GSL, p. 296.
³ Text between asterisks is quoted in K. Lyell, LLJ-CL, vol. 1, pp. 164-165.
⁴ Henry Warburton was a member of GSL council from 1812-38 and M.P. for Bridport 1826-1841. Woodward, History of the GSL, p. 307.
⁵ Text between asterisks is quoted in Wilson, Charles Lyell, p. 153.
⁶ The Quarterly Review was founded in 1809 and was generally regarded as a ‘Tory’ publication. During the 1830s its circulation was 9,000-10,000. R.D. Attick, The English Common Reader, University of Chicago Press, Chicago, 1957, p. 392.
see my article just out on “Scientific Institutions” by which some of my friends here think I have carried the strong works of the enemy by storm. I am now far gone with a 2.d & hope to be delivered in less than 3 months.[*]

On our last vol. Geol. Trans. – When mentioning the Megalosaurus I sh. have no objection to giving the Profess. a gentle hint not to appropriate too hastily a thigh or any other bone that you may claim for the Iguanodon.[*] I mean to help myself out of Cuvier largely for I must write what will be read.

The Plesiosaurus is delightful, so is Stonesfield & Cuckfield. If you can send me comments on Buckland I will use them delicately. Also say how much of the great skeleton you have now got together. I would give 8 or 10 lines to your museum – more I hardly can – if you would put down on this osteological topic any fact that is marvellous, also anything about the vegetation that you have gathered from Ad. Brongniart. This w. come in in another place.[*] was it quite tropical? What are the grounds for this hypothesis? If you will give me the title of your new work, I will advantage it in a note which cannot fail to do it good. Slips of the first part of my paper will be printed before I go circuit July 2. so lose no time. As I know you have imagination enough I trust to you seizing on points such as would do for the Quart. Rev. w.

I will send my paper wh. cannot be understood without the plates, to Cornhill with a request to send it at once, if nothing going.[*] I am now full of work so believe me

yours faithfully [*]

ChaLyell

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8 W. Buckland, ‘Notice on the Megalosaurus or great Fossil Lizard of Stonesfield’, TGSL, 1824, 1, series 2, pp. 390-396.
9 In the quoted extract of this letter in K. Lyell, LLJ-CL., the words “get it out” have been substituted for “be delivered”.
11 Henceforth, Lyell uses the correct spelling of Buckland’s surname.
12 Mantell began the M.S. of his next work, The Fossils of Tilgate Forest, on 11 August 1826. GAM-PJ, entry 11 August 1826.
July 19. 1826 Bath

My dear Sir

I seize a hasty moment to write & say that in 2 intervening days which I & my fellow barristers had to spend between Warminster Sess. & Exeter Assizes the latter of which begin this Ev. I made it my business besides visiting old Mr Lambert at Boyton & seeing Longleat, Fonthill & Wardour Castle, all within reach, to examine the country around Warminster where Miss Benett has procured so many greensand fossils. She was not at Norton Baranther herself so I missed seeing all the coll. that was locked up.

[*] The country is clear enough, & all right. [*] All her cup-alcyonia, tulip. & lobed come from the firestone, below which lies the Galt with small & large iridescent ammonites as remarkable in this respect as those of

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2 Text between asterisks is quoted in Wilson, Charles Lyell, p. 154.
Folkest. I did not arrive on my excursions at examining the Shanklin beds, altho' I entered the Tisbury (Portland) quarries but the country between them & the chalk was covered up. I expect that the Purbeck & Portland have been in that quake pushed up so violently that like the transition limest. of Dudley, they prick up like a pin thro' the rest. Perhaps it is only when the heaving force has had good broad shoulders that we ought to expect that full & regular development of formations that appear on the sides of great chains. Not that I feel sure they may not all be found for the inclination at Tisbury is great as is the dislocation & they may pack close.

I have bought a set of lobed alcyon. & some others in case Miss Benett sh. not have already presented you with them for your Museum.

You did not mention the Whale at Cuckfield.

I hope Buckland was correct in supposing there were cetacea at Cuckfield. Am I not correct in saying that the shells are quite diff. birds not yet identified in species with those of Stones. Plants fish d. Lizards d. for you can not be sure it is the Stonesf. species? In fact is there any species distinctly common to both formations? Is it not the analogy of Estuary animals? Is the Anarhicas Lupus in each? same species? Is it not also in Chalk? If mammiferous cetacea in Stonesf., in Cornbrash, Enslow & Cuckfield, why not Didelphys?

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3 Mantell began the M.S. of his next work, The Fossils of Tilgate Forest, on 11 August 1826. GAM-PJ, entry 11 August 1826.
Sect. at Boreham between the Lower Chalk Escarp. & Warminster Henslade quarry.

Veget. mould & angular chert

Green earthy sand with chert

Green sands of various shades with numerous irregular veins of chert used for building.

In the chert Tulip Alcon. & Lobed 18 ft.

A kind of chalk with green specks 4 1/2 ft.

Chert

I shall be in town in 8. or 9. days & shall be very glad to find a letter from you on these subjects.

believe me ever yours most truly

ChaLyell

P.S. Send me the date, page, & reference of your first publ. observ. on the analogy of Stonesf. & Cuckf. that I may do you justice in Q.R.

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

33

4 In Lyell’s Quarterly Review article on TGSL, 1824, 1, series 2, [See note 5, Letter 31 ], Mantell is cited as the first observer of the analogy between the fossils of Stonesfield and Cuckfield, the
My dear Sir

I see that by your last letter of September that you had not understood or I had not sufficiently informed you that the circuit (from which I last wrote to you from Warminster) would detain me till the beginning of Aug.¹ & that from that I was to go direct to Scotland & be there till the end of October when the Wilts. Sess.⁵ would again prevent my remaining here. This is my reason for not having had time to write to you but being at length in my Chambers again I beg to thank you most particularly for your letters.

That concerning the comparison of Stonesfield & Cuckfield Fossils came in good time as you have perhaps observed from my Art. in Quarterly, which Lockhart⁵ has inserted with scarcely a single alteration; but with one grievous blunder of the Press in spite of my having once corrected it. Pray alter it if you have the Quart. Rev. – Erratum – For Monster, read Monitor – p. 114. line 11. from bottom. Sept. No. 1826.

When I saw Jameson lately in Edinb.,⁸ he began to sound me as to your Geolog.¹ knowledge & on my giving my opinion he said: “I am glad to hear it for I have just printed a paper of his in my journal⁶ on an interesting & important question”. From what he said I cannot be sure whether it was then out or not. That was in Oct.

Of my review the Professor said there were three weak points, the weight attached to the authorities of Mrs Graham, Strangways & Jack.⁷ There

¹ John Gibson Lockhart (1794-1854). Publisher and son-in-law of Sir Walter Scott. Editor of The Quarterly Review from 1825-53. DNB.
⁶ In his Quarterly Review article on TGSL, 1826, 1, series 2, Lyell emphasized the role of earthquakes in raising land levels and referred to three papers to illustrate this point. The three papers in the TGSL, were: Mrs Maria Graham, ‘An Account of some Effects of the late Earthquake in Chili: extracted from a Letter to Henry Warburton Esq., V.P. G.S.’, pp. 413-415; W.T.H.F.
⁷ Reference being Mantell’s Geology of Sussex, 1822, pp. 59-60.
is something in this as far as relates to the two last, but with respect to the Chilean earthquake the fact of the chief consequences it stands on as good evidence as can be required. In truth it was not “a thing done in corner” & we might dispense with Maria Graham’s testimony who as a woman is of course incompetent in any fact relating to science or physics.

I have some greensand fossils which I doubt I mentioned in my letter from Warminster & will get them ready soon. I have been in such perpetual motion since I wrote that I have had no time. I return you many thanks for the Weald specimens. When I have looked over them more carefully I will remark on them.

Excuse a short letter at present. I should be glad to hear that Mrs Mantell is better[.] with so many domestic, professional, & legal interruptions one wonder is how you do so much. Fitton talks of it sometimes with some jealousy, who has all the time to himself & can not find enough even to write an occasional Art. in a review now.

I have been going on in Scotland with my great County Map which to do in the minute detail with which I wish to complete it will cost me several Autumnns yet.

believe me most truly yours

ChaLyell

[ Addressed to: Gideon Mantell Esq. Castle Place, Lewes, Sussex ]

34

My dear Sir

I have been absent from town, at Cambridge & am now too busy to write you more than a few lines to thank you for your handsome present of Tilgate fossils & the crag shells which will be useful to Fleming as far as they go. Dr. Fitton begged me before he left town to thank you for your note &c. He said “tell him I have received his very handsome book & will study & recommend it whenever I can – is the shell I now return to you certainly In. concentricus? It probably is – but it is also something like a gryphite”.

This shell I have for you. I will find you some rock marle & fossil chara, tho’ my gyrogonite is rare & all gone.

[*]¹ I have received your book² & paid for it which I hope your subscribers will do more punctually than Macculloch³ swears his do.

Your eulogium on my “profound legal knowledge”,⁴ though a severe quiz upon me has not been quite so much a subject of amusement to my friends as I anticipated. Buckland, however, was not a little merry yesterday at my expense. I told Murchison not to laugh too freely for I should get you by way of a set off to omit [sic] it in the 2.⁵ Ed. & to substitute for it “but more particularly to Mr Murchison, Sec. G.S. whose scientific acquirements no less than his splendid military achievements in the Peninsula under the Duke of Wellington during the late war are so well known & appreciated”.[*]

Every one admires your plates amazingly & the book seems well received but have only heard the price complained of.

¹ Text between asterisks is quoted in K. Lyell, *LLJ-CL*, vol. 1, p. 164, in which it is dated 1826.
⁴ In the Preface of his *Illustrations of the Geology of Sussex*, (see note 2), Mantell especially thanked “Charles Lyell, Esq. F.R.S., Barrister at Law; a gentleman whose classical and scientific attainments, and profound legal knowledge, are well known and appreciated”, for his suggestions.
I shall be glad of a copy of the map, but not unless you have plenty. I will have in mind your deficiency of cave animals.

[*] Buckland has got a letter from India about modern hyaenas whose manners, habitations diet &c &c are every thing he could wish & as much as could be expected had they attended regularly 3 courses of his lectures.[*]

We are to hear it on Friday I believe.

Yours very truly

ChaLyell

Temple
Jan. 3 1826

[ Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]

35

Charles Lyell to G. A. Mantell

London March 2 1827

My dear Sir

[*] On my return from the circuit yesterday I found your second letter having received the first with Lamarck at Dorchester. You know that half my time is now spent at Sessions, Circuits &c & must not

5 The Map in Mantell’s book, op. cit. (note 2), was “intended to convey a general idea of the geological structure of the area inclosed by the chalk beds of Sussex, Surrey, Kent, and Hampshire”.

6 Text between asterisks is quoted in K. Lyell, LLJ-CL, vol. 1, p.164.

7 Lyell inadvertently dated the year of this letter 1826 instead of 1827.


9 J.B.A.P. Lamarck, Philosophie Zoologique ou Exposition des Considerations relatives a l’Histoire
therefore be surprised when you receive no immediate answers to your correspondence which I always receive with great pleasure.

I devoured Lamarck en voyage as you did Sismondi\textsuperscript{10} & with equal pleasure. His theories delighted me more than any novel I ever read & much in the same way for they address themselves to the imagination at least of Geologists who know the mighty inferences which would be deducible were they established by observations. But tho’ I admire ever his flights & feel none of the odium theologicum which some modern writers in this country have visited him with I confess I read him rather as I hear an advocate on the wrong side to know what can be made of the case in good hands. I am glad he has been courageous enough & logical enough to admit that his argument if pushed as far as it must go if worth anything would prove that men may have come from the Ourang outang. But after all what changes species may really undergo! how impossible will it be to distinguish & lay down a line beyond which some of the so called extinct species have never passed into recent ones. That the earth is quite as old as he supposes has long been my creed & I will try before 6 months are over to convert the readers of the Quarterly to that heterodox opinion.

I sh.\textsuperscript{d} like to discuss these matters with you at Lewes but between Law excursions & town studies I have never a moment to spare, if ever I can I will & give you notice & can assure you that I know I shall receive a welcome & you need not therefore repeat your kind invitation.

I wish among your new Groombridge fossils there had been a good cetaceous quad\textsuperscript{11} for theoretically it would have been of more importance than the iguanodon. Not that I doubt some of the oolitic cetacea.\[*]\textsuperscript{12} I am going to write in confirmation of ancient causes having been the same as modern & to show that those plants & animals which we know are becoming preserved now are the same as were formerly, e.g. scarcely any insects now, no lichens, no mosses &c ever get to places where they can become embedded in strata. But quadrupeds do in lakes, reptiles in estuaries, corals in reefs, fish in sea,


\textsuperscript{11} In K. Lyell, \textit{LLJ-CL}, p.169, the word ‘cetacean’ has been used instead of ‘cetaceous quad’.

\textsuperscript{12} Text between asterisks is also quoted in Wilson, \textit{Charles Lyell}, p. 162.
plants wherever there is water, salt or fresh &c &c.\[^{13}\] Now have you ever in Lewes levels found a bird’s skeleton or any cetacea. If not why in Tilgate & the weald beds. In our scotch marl tho’ water birds abound in those lakes we meet with no birds in the marl; & they must be at least as rare as in old freshwater formations for they are much worked & exam\[^{d}\]. You see the drift of my argument – ergo mammalia existed when the oolite & coal &c were formed.

Broderip says that in spite of all the dogs & cats which float down the Thames none of their remains have been found in recent excavations in the Thames deposits. Send me your thoughts on the subject. If I am asked why in coal there are no quadrupeds I answer why are there none nor any cetacea nor any birds nor any reptiles in the Plastic clay or lignite formation a very analogous deposit & as universal in Europe. Think of these matters & believe me yours most truly [^*].

ChaLyell

[ Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]

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Charles Lyell to G. A. Mantell

[^13]: Quoted extract in Wilson, *Charles Lyell*, ceases at this point.
My dear Sir

I was glad you did not arrive yesterd'y morning at Maidstone before we left not only because there was less done than we had hoped but because I am sure your idea of riding so far after such fatiguing duties would have been exceedingly imprudent. We regretted your not having been able to dine with Murchison very much to fight the battles of the green sand & the Weald which engaged us more warmly than the hyaenas. The party consisted of Prof. Buckland, Dr. Fitton, Mr. Greenough, Mr. Murchison, Mr. Randolph, Dr. Burton, & myself all Fell. of the G.S. & Mr. Lennie, Rev. a cambridge man friend of Dr. F. who is to F.G.S.

Mr. Braddick of Boughton Hall & his wife are a description of animals whom we were more surprised not to find extinct than any cave bears or mastodons who might have issued from the quarries in a living form. He entered into the navy it seems & then turned merchant in America, gained much money, had been much in Germany with his family & in other parts both sides of the Atlantic, a great gardener, planter, architect, savon – Geol. Trans. Annals of Phil. &c on his table. Had been building a most expensive house, farm offices, walls for grape green houses &c all in peculiar construction. Grottos in the garden with Greek inscriptions, a mint of money buried without much taste. His manners those of a yeoman who had made a fortune by farming. His wife waited at table like a servant, yet was his wife & received us as Hostess. Everything on the table wine, beer, cakes, bread & cheese homemade, never dependent on anything but the estate pride themselves in living precisely as if they were literally in the back settlements of America which the whole concern much resembles.

In some quarries of Kentish rag used for the piles of buildings with which he is loading the estate are huge rents filled with rubbish & in these

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1 No date given by Lyell but the letter was post-marked 6 June 1827.
2 In 1827 there were two GSL members named Randolph, the Rev. Francis Ralph Randolph (1752 - 1831), Divine, who would have been 75 years of age at the time of this episode, DNB, and the Rev. John Honeywood Randolph who served on the GSL council from 1827-32 and is more like to have been a member of this party. Woodward, History of the GSL, p. 305.
4 No Rev. Lennie is listed in Cantabrigiensis Alumni over this period. However, Lyell may have referred to the Rev. Christian Lenny (1803 - 1882) , who was a deacon at Rochester in 1827.
caves not such as are in thick strata of limest, but such as an earthquake shaken mass may present, in the fox-col. mould of these have been found remains belong.⁶ to at least 2. hyaenas but the teeth & bones are few. It is the extinct Kirkdale species. The rubbish filling the pipes up contains not only this mould but chert & chalk to the G.S., was groecum called album – also a few shell flints. All this has been washed in.

Buckland says the hyaenas too may have been washed in but he sh. not wonder if it had been a cave & much may hereafter be produced as the workmen have often found bones. The teeth of horse, rat, & rabbit? were of doubtful age but the first probably as old as hyaena. This was all at present for as it is not a positive cave or if so filled up we must wait for the prospect of quarrying before we get much. I got no bones & there were hardly enough for the Soc.⁷ & Dr. B.

I was glad to see the Kentish rag quarries. It was just like Pulboro’ but there are some beds of pure limest. like mountain limest. Braddick says they contain above 90 per cent carb. of lime. Such a collection of chalk & plants might be made there! We observed the following – Shells – Ammonite 4 spec. one immense size. Nautilus – 2 sp. – Cyrrhus large one – Cucullaea – Gervillaia -Pholadomya – a new one – Gryphea sinuata & another small – Mya ? – Trigonia 2 sp. – Pecten orbicularis common – Serpula – Fistularia (a boring shell), – stems of alcyonia – small belemnite – dicotyledonous wood apparently more than one kind & a fine palm. One soft green bed which they call hassock & which alternates with the building stone is not distinguishable from the malm rock of W.Sussex & contains sometimes to complete the resemblance, alcyonia stems. So there are two green sands.

We went on a wild-goosechase to look after Martin’s⁶ notable discovery of a bed of cyclas sandst. above the uppermost Sussex marble of the weald & found none but what if it be there? 4 ft. thick & a sandst. not worked & where the beds are inclined is easily overlooked. Fitton says it is

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in I.of W. It makes no difference in the propriety of separating the beds as you have done.

yrs [illegible]

ChaLyell

P.S. Fitton would be much obliged to you for a list of your fossils of the beds from the Firestone to Portland inclusive. If you do not want them to publish he w. acknowledge them handsomely.

[ Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]

37

Charles Lyell to G. A. Mantell

[30 June 1827 ]

My dear Sir

My friend Mrs Whitby\(^7\) of Newlands near Lymington Hants, is to be at Eastbourne shortly & intends to take Lewes in her way from thence to Brighton. I promised to write to you & inform you that about the middle of next month you may expect a letter from her concerning the day she will be

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\(^7\) Mrs Mary Anne Theresa Whitby (1784 - 1850). Daughter of Captain Thomas Symonds R.N. Married Captain John Whitby R.N. (d. 1806) by whom she had one daughter. The widowed Mrs Whitby did not re-marry and lived out the remaining 44 years of her life on her estate at Newlands in the parish of Milford, Hampshire. She was an antiquarian, accomplished artist and investigated the feasibility of producing silk in England. R. Colp, ‘Charles Darwin and Mrs Whitby’, *Bulletin*
in Castle Place to see your Museum. She has an estate in Hants in which Hordwell Cliff is situated, & is fond of Geology. She is a lady of more accomplishments than any other I have ever been acquainted with & I shall be glad if you chance to see her, as she will only be in Lewes while her horses bait. She is a most admirable draughty woman & you will find that she will be interested in everything, antiquaries &c. her daughter will be with her & I at least hope that Mrs M. may be at home.

If you find any difficulty in collecting your subscription for your last work\(^8\) which Mrs Whitby has, I can assure you that Relf[e] is much to blame. In the first place I hear continual complaints that people cannot get copies – then the price is not sent then Relf[e] sends a note of that but does not send his own address so that half the would-be-purchasers cool in the arduous undertaking to get the work, & must then turn duns to be permitted to pay. It would be a good mutual arrangement for relations in different Professions to agree never to employ one another.\(^9\)

I hope you like my Review in the last Q.R. on the State of the Univers.\(^{10}\) & expect you will see another in the next on “Scrope’s Geology of Central France”.\(^{11}\) Most of it is printed & I fear it will annoy Buckland but “amicus Plato sed magnis amica veritas”\(^{12}\) should be a geologist’s motto. Perhaps it may annoy Scrope too. In fact reviewing is an unwholesome trade to a man who has any conscience altho’ I have not found it hitherto because I never before reviewed any man’s work.

believe me ever most truly yours

ChaLyell

Temple June 30

1827

[ Addressed to: G. Mantell Esq. Castle Place, Lewes, Sussex ]

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\(^9\) Lupton Relfe, Mantell’s publisher, was also his brother-in-law. *GAM-PJ*, entry 6 May 1822.
\(^12\) “A friend of Plato but a greater friend of truth”.
My dear Sir

You may safely consider me out of town either on circuit or Sessions or some other of the tours which render me a rolling stone accord. to the present as well as an investigator of stone whether rounded or not when I do not acknowledge for so long a time your letters & presents. I am much obliged to you for your duplicates & as I have now commenced a cabinet in earnest you cannot do me a greater service than by giving me any duplicates you may really have to spare from time to time.

Mrs Whitby was amazingly gratified by your collection & she has written me a letter which convinces me she is really determined to follow your example as far as she can. She particularly admired the connection of the rock specimens with the fossils.

As having been absent I have had no opportunity of consulting Sowerby about the shells & the persons for whom you have put up some duplicates are all out of town, but when I return in Nov. or before, I shall learn about them.

Every thing connected with the freshwater nature of your beds interests me much. Ferussac seems to assert that not one positively freshw. shell has been found in the Green sand (meaning the Tilgate beds) below the Chalk in England. I must learn of him about them.

I write in haste & must be brief. I admired your simile of the broken vase, it is as good as Goethe’s comparison of Hamlet &c.

I leave this for Scotland immediately. I will certainly have a look at your collection before next Spring.

With compl. to Mrs Mantell believe me most truly yours

ChaLyell
P.S. Excuse my keeping Daubisson\textsuperscript{1} on. I expect a copy which I have ordered tomorrow & then I had better give you the new one for I think I have marked yours & that there are no marks of yours which you will want? I find a specimen marked Inoceramus concentricus. Probably the one I believe which we had a search for & which is quite safe for you.

P.S. 2.\textsuperscript{d} I forgot to say that Lockhart when I last saw him begged me to say that he felt much obliged to you for your present of your work & that he sh.\textsuperscript{d} have acknowledged it but that it was a general rule for the Editor as they so frequently receive presents of this kind not to spend a large part of the day in writing notes of thanks. Accept therefore his thanks thro’ me.

\footnotesize{[ Addressed to: G. Mantell Esq. Castle Place, Lewes. Sussex ]}

\footnotesize{\textsuperscript{1} Jean Francois d’Aubuisson de Voisins (1769 - 1819). French engineer and mining geologist who examined d the Auvergne volcanoes. Sarjeant, $G & H$ of $G$, vol. 2, p. 452.}
My dear Sir

I beg you will not imagine that I can “be tired of seeing your writing”, but from the length of Time your letters usually remain unanswered you might suspect it. But numerous as are my absences from town I cannot but think your letters have a singular knack of exactly hitting those periods which they have done now, for I have only just returned.

I have brought you some specimens of soft & of rock marl with gyrogonites which I was never able to procure till now. They are not yet come from the wharf. Many thanks for your Geol. of Rape of Bramber\(^1\) which is a very good sketch & will be of great local use. Where is Patrin & Graydon’s\(^2\) theory stated? pray let me see it if you have it. As we only know of silex from volcanic thermal waters I always lean to supposing a volcano when it occurs, that is to say a volcanic source. but such numbers of fossils could only have accumulated in ages, & such changes in organ.\(^3\) beings as are

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\(^1\) G.A.Mantell, *A Sketch of the Geology of the Rape of Bramber in the County of Sussex*, W.Lee, Lewes, 1827. Mantell’s aim in producing this 16 page publication was: “to illustrate the Rape of Bramber as an epitome of the Geology of Sussex”.

\(^2\) On pp x and xi of *Geology of Rape of Bramber*, (note 1), Mantell stated: “And from the fact that many of the fossil fishes [in the chalk] appear as if they had been surrounded while in a state of progression, the conjectures of M. Patrin and Mr Graydon, that these strata have been formed, and the animals destroyed by submarine volcanic eruptions of calcareous stone ejected in a calcined state, appear to merit attention”.

\(^3\)
found between upper & lower Chalk? What you say of the Cherry Hintons is curious for Dr. Fleming tells me he has just made out some puzzles among the Scotch Coal plants by the analogy of roots of aquatic plants in modern peat moss & marshes. If you can lend me a “larch cone” to show him it shall not be lost this time, & he will get you the recent analogies to compare. You say the Tertiary Form. were formed in a “cavity of the Chalk?” Were they so? There were inequalities & valleys & cavities no doubt in the chalk when the Tertiary were formed but the basins, or great cavities wh. w. now be in chalk if the tertiary were removed are from the elevation of the chalk on each side of the basin? Why no stony corals in Chalk? Are they not now confined to tropics? If so, Dr. Fleming would rejoice as he says the temperature has never changed! Do you find in chalk & other beds abounding in Echine the hard beaks or long mouthpieces of these animals? They ought to be very abundant as they are harder than the shell?

Have you remarked any difference between the remains preserved in chalk flints & those in pure chalk, indicating the power of silicification as to hand down to us some organ. remains which Time would have otherwise effaced in mere chalk? De France discovers that in French Tertiary beds univalves perish first. Are there more univalves in the flint than in the Chalk?

Dr. Fleming of Flisk will exchange modern British shells named for any British fossil shells or org. remains you may possess duplicates of.

I hope my last Article on Scrope’s Geology will please you (Oct. Q.R.).

I have still your Lamarck. Have you ever wanted it? if so, I will send it. Indeed it is parsimony not to buy it.

I wish D. Gilbert was to continue P.R.S. but Peel it seems is the man. I am glad however the compliment is paid D.G.

With my compl. to Mrs Mantell & hoping to hear from you soon believe me ever most truly yours

ChaLyell

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P.S. Query.[*]⁶ Are Fissures & faults common in the Sussex beds, in chalk &c? Are they more numerous where inclination greatest. Does one occur upon an average in every pit? [*]

[ Addressed to: G.Mantell Esq. Castle Place, Lewes, Sussex ]

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⁵ Sir Robert Peel (1788 - 1850). English Statesman and Premier 1834-35; 1841-45; 1845-46. DNB
⁶ Text between asterisks is quoted in Wilson, Charles Lyell, on p. 183.