October 10th

3265 Trachytic cellular Lava frequent large Crystals of glassy Feldspar — commonest kinds low down

3266 Base (blackish grey) more abundent. (Olivine?)

267 do. with scarcely any Crystals

268. — Compact Lava with many small Cryst of glassy Feldspar Basis finely Crystalline — both latter more central parts

269 Imperfectly & highly cellular Trachytic Lava. with many Cryst of glassy Feldspar. outer surface light red glassy Cinders

270 do. with imbedded fragment of altered granite

271 272. 273) imbedded fragment of do. varieties. coarse & fine grained. quartz Cryst. generally visible: Mica changed into glassy mineral — some perhaps Ignited:

274 do — perhaps part of Quartz or Feldspar vein

275 Red harsh Claystone base. with red earthy particles & glassy Feldspar: generally more of latter & more cellular

276. 277. Light dark greenish brown. semi-indurated Volcanic Sandstone

278 ~~[illegible]~~ brown.. small cellular. Trachyte. (Pap)

299 — fig. compact do. few Cryst of glassy Feldspar

Freshwater Bay. where we are bivouaced is formed

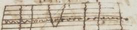
(W) on its Western side by large circular hill with Crater on top. from which the Strata dip in folds on all sides. — These are of Volcanic Sandstones. — containing in layers

(a) This is the principal & largest one in the neighbourhead & highest

These columns project. — Infiltration hypothesis inadmissable. — Apparently currents longitudinal to Cone — The stratification does not always correspond. though generally to the sides. —

numerous angular & semi-rounded fragments of 717 (2

Lava. I have seen from the boat, that

there were alternation in 

vertical ~~strata~~ masses:

The strata here were yellowish & apparently fine grain

they were crossed by mass. of a darker variety. —

the edges being serrated — The lines of strata were

continuous, as well as layers of pebbles. — Some

of them were wedge-shaped, generally however

sides parallel. — The appearance is as if

some fluid had altered the rock for an

equal distance on each hand. — This

they perhaps be the real explanation for in

such I generally noticed a fissure: However

there were similar fissures traversing the

yellow intervening substance without any

such effect. — Hence Besides this Volcanic

mound which I suppose to have been

subaqueous — There are others of similar

constitution: — On the East side of

Bay, — a narrow point is I believe a mere

slip out of large Crater (). — There

is however much confusion in its composition.

The exterior diverging beds are almost

wholly composed of strata layers of coarse &

fine red slag Scoria. & fragments of Basaltic

Lava: & then fine detritus. — The fragments

Mr. Chaffers Observations.

On Bindloe's Id. there is a Crater of Volcanic Sandstone. at a height of 300 ft he extracted some marine shells from ~~it~~ (fragments of Oysters were abundant — there was some ~~tru~~ Trachyte. but the commonest is a jet black glassy. service. which from its form must have been singularly liquid. (— 3286). —

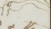
Tower Id. is low. & horizontally stratified. & without Craters: consists of very cellular Lava. — of a grey color. apparently minutely Trachytic. — (3287)

Abingdon Id. Consists chiefly of small cellular. reddish. Brown. Lava abounding with very large & numerous Cryst. of glassy Feldspar. — (3288) (Also Sandstone Craters. —) There is other variety browner. more compact. almost composed of less fractured Cryst. glassy Feldspar angular vesicular cavities (3289). — In the former. the appearance = singularly that of imbedded fragments

---

Indefatigable Island very little Black Lava.
Barrington Tampoco. —

Culpepper. Wenman

are scarcely at all agglutinated. — Yet 718 (3
in places thin layers of pumiceous dust.
consolidated & stratified led me to presume
they were of subaqueous origin. — I believe
the terrestrial origin is certain from a layer
of small rounded particles of cinders abounding
with Bulimi in an extreme state of decomposition.
In this mass are some small Lava streams.
One point is rather curious. — The coast
& a ravine gives two section at rt L^s of a
minor point of eruption. — On the beach
there are two or three, worn, pieces of Trachytic
Lava. slightly cellular, of a brownish color (3278)
One of them is (at the angle of the section) about 15 ft high & joins on
to ~~them~~ a diminutive stream of Lava. 
These first bend, slightly downwards. then upward & then
again cataract downward. — showing their course
over rim of Crater. — Above these there
are about 6. more. which are not now
joined to the column of Lava. Such
having been removed. — These stream are
as I have said ~~most~~ diminutive. Yields
their length is of 10-20 (15). yard downward
60-80. — ~~The terms upwards & down~~ the
must be remembered. this latter eruption
took place on the slope of a Crater. —
The thickness of the streams correspond to their

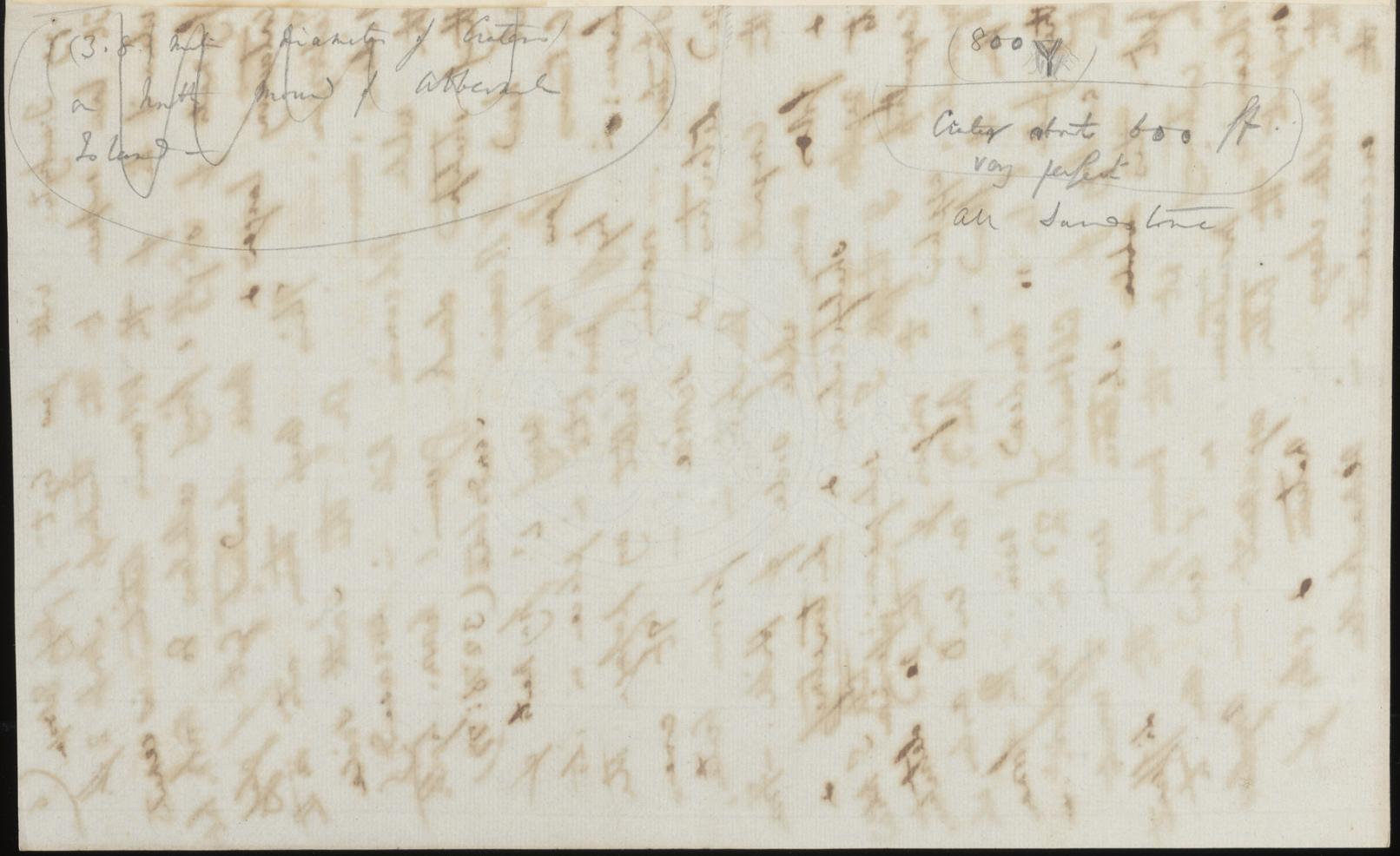
lengths. — ~~I measured~~ They all consist of a highly cellular greyish base abounding with large & numerous crystals of fractured glassy feldspar. — The outer ~~edge~~ surfaces for about 2–4 inches is converted into tuft sandy scoria of a glassy texture & fragments 3269. — Such fragments of scoria separate the streams. I measured one stream, of which the Trachytic dark part was 8 inches. to which my have added 6 inches for the superficial red cindery matter giving 14 inch for that thickness, & this for whole extent. — Another was altogether only 8 inches. — The rest from one to three feet thick. — The ~~loose~~ intervening scoria. being of rather greater thickness. — This Trachytic Lava is remarkable of containing very many fragments of altered rocks. which clearly have been Granite & Syenites (3270: 71: 72: 73) The glassy substance into which the Mica is converted is remarkable. — The Fragment apparently has been part of a former vein. (3274). — It will be remarked. that the Crystals of glassy feldspar are not enlarged of meltier: neither are the Granitic fragments. which would induce one to believe all the glassy Feldspar, which is similar to that of the Granite. ~~his~~ are imbedded: — A conclusion. which

I do not believe, from reasons which will be given, — I should suppose all these ~~streams~~ lava have been ejected at one ~~eruption~~ epoch & at short small intervals of time separating ~~the~~ streams. — It is remarkable to find Trachytic Lava. — one supposed to have little fluidity forming streams 6 & 8 inches thick. —

The pile of scoriae is traversed in many & great broad dykes. running for distances vertical & several yards thick., composed of 89. compact Trachyte. with very few Crystals: sides & certain spots more cellular. (3299). — The eruption of such matter doubtless has formed the smaller part of ejection. — In one part of the ~~pi~~ pile of scoriae & fragments. — there were very many large pieces of a hard red Claystone (?) more or less vesicular & containing more or less Cryst° of glossy Feldspar. ~~Specimen~~ small bright red earthy specks. — Specimen shows the two cases in lesser extreme (3275). — I did not reach any stream of this rock. but it must be very abundant. — In contact or rather lower part of the promontory which I believe to have been bosom of Crater. There is a mass about 200 ft thick of a greenish or blackish compact.

grey. Trachyte. with few cryst of glassy Felspar. 721 6

It lower surface to the thickness about 2 ft.
where it lies of the Volcanic detritus. is composed
fragments of slightly & finely cellular do rock, but
containing larger & more abundant cryst of glassy
Felspar. — This mass thins out on the
sides. — On the South side
the whole Volcanic hill is encased by
thinly stratified dark. greenish brown. tough.
not hard Volcanic Sandstone (3276:77)
Contains few large. nearly L^d. fragments of
Lava: — highly pisolitic in places in its
structure — rocky. without any passage the
2^d detritus & series. — It covers
the compact Trachyte in former crater,
& slopes over whole side of Hill. — From
its regular stratification & distinctness &
compactness I think I subaqueous: inferior like I noticed
argument applied to origin of the 2^d detritus.
then it flowed as Mud. or could ashes, which
they fall be so hardened by rain. — The former
to analogy of Albermale I^d is sufficient. —
Yet. this ~~whole~~ substance seems to unite
so continuously with the bases of the different
Volcanic mountains, as to lead me to
suspect the latter argument. — Anyhow
the sudden change in nature & color of
this encasement is remarkable. —



722 (8

Stream. — Have burst from several small Craters at foot of central Trachytic mass of topped hills & craters. — Consist of ~~vesicular~~ greystones such as (3280) which abounds in a very remarkable degree with quantities of Olivine. is generally very Vesicular & sometimes rather a Rocker [illegible] (3281). — The Base is much the same as in central Trachytes. the Olivine here replacing glassy Feldspar. — Its surface is smoother than the Basalt of Chatham Id. — yet many great fissures. — Surface rugged (like Cow-dung). which often takes form of Cables; flows in a rugged Cloak & hanches with rough hairs. In this Island we have thus Olivine Lava as the latest which is alternate that of Trachyte. — near to the sea, it has burst through an ancient crater. (composed of green-coloured 2d glassy Scoria & greystone Lavas) filled up crater & left only 2. pieces. which stand in front of each other. —

There is here a Beach. of large rounded Cobble stones. above present level of tides. although only a few feet.

Travelling inwards in a SE line. when 723 (7
beyond the influence of the Sandstone Craters.
All the soil is highly cellular blackish
grey. Trachyte. abounding with glassy Feldspar:
(3265). parts are more compact (3266). —
More in the interior. compact varieties are
common. Containing more or less numerous Cryst:
of glassy Feldspar. — Here I found a very
perfect Crater: well wooded. but entire. &
large. — Generally it may be remarked
that the more cellular Trachyte. contains the
largest & perhaps more numerous Cryst of
Feldspar. — This is the reason. I do not
believe they preexisted. — Circumstances
determine there size & numbers.
Specimens of More compact kinds 3267: 3268

October 11th

3280. Black grey. Lava. abounding with Olivine. having
same as Trachyte. latter mineral replaces glassy Feldspar
3281 — do. Blacker more cellular. — Both very
recent stream. —
3282. Yellowish-brown Sandstone Resinous — Black glassy Feldspar
3283 — do. compact & Resinous fine grained Sandstone.
at Puerto Grande. — Here is stream of Lava. 4
miles long & 1–2 wide — very recent. without
vegetation. — surface glossy — yet covered. 5 other

in little Espuma. which have acted as Fumaroles: sides being white. — Although this appears as but of the other day. — It is covered by a brown ~~Lava~~ — which ^seen ^from size of trees growing on its very margin. must be many years old. — ~~old~~ — a Terapin was caught some years since with its shell appearing to have been burnt years before. The inhabitants believe in the the effects of Volcanic fire — I rather ^suppose accidental fire in wood

Puerto. Grande 724 (9)

To the South of this stream & a mile & 1/2 from the Beach. there is a Salina. which is worked for Salt. — It occurs in a Crater — about 1/3 mile in diameter nearly circular. & not beautifully regular sides very steep. — Rim rather higher on one half than other. — but not broken down. — where highest. about 400 ft. deep. — This is much deeper than the surrounding country. — Indeed on S.E side ancient Olivine Lava. streams. have nearly brought country up to level of the brink. — The whole upper part of rim. is composed of compact. glossy. yellowish brown Volcanic Sandstone. — some of which is Semi-Pearlstone in its nature, & contains small glossy patches like in Chatham Id (3282 — 283). — I do not doubt is of subaqueous origin. — although worn down. there is much of a ~~greenish~~ darker brown. — Pisolitic Sandstone (like that of yesterday. only rather more compact. — In all parts few fragments of Lava. — These compose 2/3 of descent. — lower third of whole circumference is very precipitous & composed of Olivine Greystone. — It appears as if whole bottom

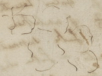
hardening in the air of flowing mud either in the sea perhaps would not essentially differ

(a)

of Crater. composed of Stratified Tuff. had been blown up. & great eruption of ashes beneath water had formed the upper $\frac{2}{3}$ of unbroken rim. — at base of Crater. Lake surrounded by green margin of Succulent Plants. — Lake about 6–12 inches deep — never dry. rests on pure Salt. — There are three or four distinct layers about 3 inches thick. separated by impure Salt. — the whole resting on sand — I have Water for Analysis. — Side of lake deep mud. — Some Crystals of the Salt splendid cubes. sides nearly 2 inches long. — This Salina is on the Projecting Headland. South of Puerto Grande. — There is another higher & similarly constituted hill (said to be) also with Crater containing Salina. — And another most lofty Mountain said to have dry Crater. Entirely constituted of the Volcanic Sandstone. — These when they enter the sea from Conformity & Stratification & especially first position I cannot doubt are subaqueous origin. — Yet on slopes of this Mountain & where joined the nature precisely resembles those which I have believed to be subaerial. It is a difficult point. — The slopes of this Mountain are really extraordinary. from the great extent & perfect smoothness of the

(5) folding layers of this substance. — It

precisely resembles a plastered floor. —



Small branching fissures
from drying —
Large extents. —
Mantle round the base

Galapagos [illegible]
October 1835

~~Hood Island~~ a very great number of small Craters appears a Mass of Lava — 726 (1

Sept. 16th. N. West end of Chatham Id: surface large angular ~~crystalline (3228)~~ fragments of black-basaltic lava = vesicular in bands: surface also, & lowest in fragments highly vesicular. — Only stratum consists of angular & some rounded of vesicular & semi-compact (3239) Lava cemented by a very hard Calcareous sand. composed of broken shells — a few perfect ones (Specimen): Lime has penetrated some of the most prom. Lavas. — ∴ elevation recent & subsequent Lavas. Very shoal sea.

Outlying rocks () columns — in parts resembling St Jago. — Sand on beach either composed of this or of minute bits of shells:

~~N.E. end of Island~~ N.P. Calc: Tufa

18th — Beds of Black & grey Lava: surface partially smoothed over with a Calcareous Tufa & the interstices of Lava are so filled up.

About a league inland. ~~detached~~ Tuff hills. in part (2
detached or ~~[illegible]~~ joined with a central mass;
have that | Strata dipping from a common centre on all sides. at
about 40°. — Consist of lower bed. ~~with~~
crumbling strata & concretionary structure of 3220:21:
a compact, ~~[illegible]~~ hard. yellow. resinous. substance; containing
(a) covered by more compact homogeneous
No Lava in the folds which are now exposed | (b) 3223. 3224 , — Contains occasional
fragments of Lava. — Central mass Amygd.
Dyke in the Tunnel. — Evidently submarine above
the Basaltic Lavas. — A Volcano
after having poured out Lava has ejected much
Much Ashes; which having collected round from deposition
it ... & lastly filled up the Crater:
... — There are other
similar hills.. — ~~A point in ... of~~:
Thicker rock appears very same formation: —
~~Also many Black Basaltic ... at~~
~~a great distance~~: — Top of thicker rocks
& opposite part. appear me to have formed
a plain. if so horizontal superficies have
equalled the —

(2) Crystals. — & little Calcareous matter. — I presume
in a sedimentary but most curious substance
Parallel ridges having appearance of Dykes
consist which traverse whole mountain consist of
of a more compact kind: which in sides is yet very distinct from strata — (3222.) —
This substance is of great thickness some
100 ft covered by 30–40. ft. of harsh. brittle
not hard. earthy Volcanic Sandstone, more
or less coarse. (3223: 3224). — The centre
of the Crater, the highest part of hill,
is chiefly composed of a pale coarse (white
patches) earthy Sandstone (3225). —
Which rock a pink in front appears same
formation: the Sandstone however is hard,
fine grained compact. — containing minute
patches of the Recent substance (3226).
I traverse by dykes. — Appear remains of
other Craters: Deposits from which have produced
the Kicker: plain of
as I have said Kicker rock is thus formed
Cause of level top. — I do not understand
certainly parts of Sd Volcano

Chatham Id.

728 (3

to SW of this Crater. there a undulatg district. of a black ragged appearance, strewed over with Craters. which most strikingly reminds me of the Iron Founderies in Staffordshire or Shropshire. — It contd in space of a few miles upwards of 60. —

for fuller account V. Small note Book

(3234). 2 specimens of the common Cyst. not highly cellular Lava, with Olivine &c

---

Again to the SW of this Cateriza. district there is a high hill, which from a point (Finger Hill) & is nearly opposite to Kicker Rock ~~Hill~~. — Round its base the more modern Lavas. had descended have flowed: — It is in its constitution. closely allied to (Crater P 2). —

The very N.E. point of St. Kings Harbour is similarly constituted. —

729

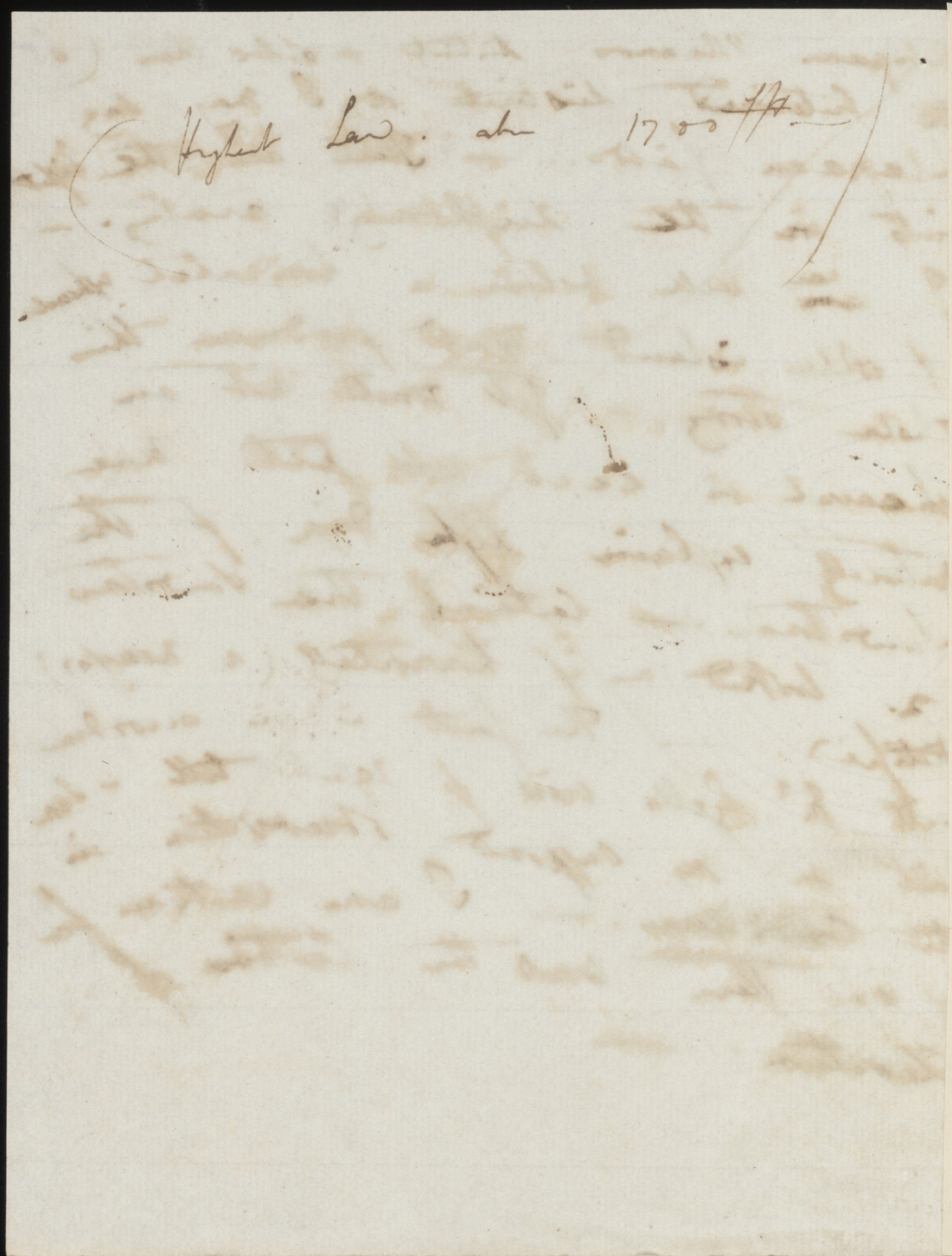
.·. Appear generally ~~amorphous~~ composed (4
of Sedimentary Rocks. 3226 & 3238.
When fragt pebbles. particles of Porphyries? Pumice, broken crysts
(a) are imbedded in a brown very compact almost crystn. paste:
which contains many well rounded large
pebbles & amygdaloidal vesicles / a compact
Lava. — So compact & hard. — Traversed
by dykes. (which in the one spot, thinned
slightly downwards) of ditto. but a trace
more compact substance (very similar
3236. — 3237). Till I examined
it. could not believe it was not
true Basaltic dyke. — ~~The mountain has~~
~~Has~~ been fissures filled up. The mountain
again, subsequently to upheaval. has been
fissured widely in same direction & now
filled with loose fragments: of
very compact nature of stone & refilled
fissure. Did not point out stripes nature
(the well rounded form of numerous pebbles would

(a). Which papers at the Revision substantiate
mentioned at P. 2. —

do so. — Generally this stone is amorphous; but in other spots a water formed dip at high angle, about 50°, can be clearly be perceived. This Hill within recent period, in place of Peninsula has been island. — The sea has nearly cut the mountain in two, on the present inland side. — We see a funnel shaped mass of black ~~compact~~ ~~Augitic crystalline~~ (with red Olivine?) Basalt. (3235) compact, owing to its subaqueous origin. — covered by thick stratum of more vesicular nature; The edges of the funnel spread out & cover on each side the sandstone; the lower part being vesicular & nearly like the upper part. Coarse.

We have now seen four points very similarly composed which have clearly been

subsequent Volcanos: distinct & older than 731 (6
the Craterized district. or, I may say
Chalapagan fields.. — These are the highest
points in the neighbouring country. —
I ~~am~~ can well believe a horizontal upheaval
of whole island would produce this
whole story. — yet would not an
upheaval in each ~~ab~~ point more
naturally explain high dip. of the
Sandstones. — Certainly the Sandstone
E.a. looked as if horizontally (& nearly so)
stratified. — The fact is in accordance
with Mr Lyells views of Volcanic tuff in Sem
point & my supposed observation in
the Cordilleras. — I am cautious of
of so.. These would the Craters of
Elevation. —



Hood Id. swarm with Craters. <u>Charles Id</u>; (nearer 14, than 800) 32

The highest hill is ~~2000~~ 1800 ft. a much broken Crater: excavated red glossy Scoria. — From this point I ~~[struck]~~ counted from 35–40 hills. in summit of all of which there is a more or less perfect circular depression. — On the lower parts there are Basaltic & Greystone vesicular Lavas: generally the whole is covered with vegetation & there appear to have been no recent stream. — Mr Chaffers informs all the small Islands around Charles have all Craters. — Champion. Id: is a much weathered Crater: partially composed of Sandstone: containing marine Shells. — From the highest point 400–500 ft. Mr Chaffers brought me a Murex. — Has this been a horizontal upheaval. — Everything shows

Volcano, for near the shore there is no bottom with 160 fathoms: Actinized district level.

that in place of these Islands being formed of pile of poured out matter, there has been upheaval extending over these different Is^d. — Both on Chatham & Charles Is^d. there is a beach of broken Lava stones above action of present surf. Best section found by clean broken line. — The height of this beach appears I think slightly to differ. Where most, probably not more than 15 ft above highest wash. — // Button island of Crater. subaqueous strata about 45 — they stretch to W end of Albemarle Is^d. Black Lava streams at west end. Large round mountain from the which immense streams of black Lava can be traced, low country beneath, studded with low & very perfect craters in a more extraordinary manner, even than at Tenguen point. Here may be considered as flank of one great

October 1st Abercrombie

Banks Cove is seated in the midst of craters: Examined the one a short distance to the South. — Crater Elliptic. Longer axis N & S. — length perhaps 3/4 of mile. breath 2/3. — Side in highest part about 500 ft. above base. — open to S. & Seaward. — An immense stream of Lava from the mountains behind. has crossed the mouth. form part of it extends inwards & part towards the sea. — Hence it is separated from a broad tract of this substance. ++ The bottom of crater is a deep lake of very salt water. in both. if it also elevated above the sea.) — In the middle are three Islands. in one of which a small crater is very evident: — In the whole circumference the rock is Volcanic Sandstone. Col (3249). generally of brown or yellow colour not very compact or hard. — some of the lower strata are

735 (10

however much more so. — In very many parts there is a pisolitic structure. (3250) the balls from size of shot to small bullets. imbedded. formed of thin concentric layers of fine mud. — Contains in places. abundant broken Cryst of Olivine & glassy Feldspar. — In all parts. very many large & small ~~more or less~~ imperfectly rounded. fragments of cellular & very compact. Greystone & Basalt. & much vesicular Trachyte. — These pieces are arranged in layers. — I saw some strata. almost entirely composed of such fragments. — The whole of this grand circle of Sandstone is thinly Stratified: all the folds dipping very regularly from angle 25 to <u>33°</u> ~~to~~ from the centre of Crater. — In no part is there a stream of Lava: But it is manifest. the Volcanic eruptions

have taken place through such:— The external
sides of the Crater slope up regularly at
about same angle as the strata.—
They ~~are~~ are furrowed (as indicated) at very
regular distances, from the lip of Crater
to base.— 
These longitudinal domes. are from 8
to 20. or 40. ft wide. are separated ~~fr~~
from each other by gullies.— are not formed
merely by the excavation of these latter:
because the strata of each correspond.
with the curvature of dome.++ The
appearance of the Many is that of a
plastered (plaster cracked & in plates, some of them rough of half way down the side)
archway.— The gullies between no
doubt have been. deepened.— ++ by alluvial action;
Hugh up. These archways are sometimes

hollow & have then a structure & appearance
identical with those ~~lava~~ of Basalt described
at Chatham Isd. — at the very lip of
the Crater. these form the hoods. more
on lip hollow. ~~[illegible]~~. — Also on
the external highest part of sides ~~of [illegible]~~ of Crater. there
are numerous gutters: () from
1 to 2 feet wide. formed of the Sandstone:
formed as it were of mass to conduct
a fluid. — There can be no
doubt. from this description. but what
this has been an exclusive Mud Volcano: from
the very edge. the boiling thick
mass has poured over in narrow
streams. — From evaporation & cooling
the upper surface has occasionally
hardened. whilst the central has flowed
onwards. —

It is worthy of remark that in this the highest part the pisolitic structure is well developed. — From the outline of the gullies & archways being preserved so perfect. it is manifest ~~matter~~ this matter has flowed over the sides. ~~subsequent~~ ~~[illegible]~~ in the air. — or removed from the action of the sea. — Yet from the situation of the lowest strata. (their compactness or ~~or~~ / which agrees ~~with~~ what has been drawn in Ultrafera ??) I feel no doubt they are marine: with this view another fact coincides. — Within the valleys  in certain spots. to the height of about 100 — 150 — ~~200~~ ft. there is a casing of similar sandstone (abounding with stony fragments) which dips very regularly to the

739 (14

centre of Crater: From the ~~stone~~ composition of this I have no doubt it is a quite subaqueous formation. — It was remarkable how very little any thickening of the strata. although inclined at the high angle of 36°. — in the lower parts, could (if at all) be perceived. — There are also piles of detritus. —
Hence. probably this was a mud Volcano in the sea: ~~hummocks upraised~~ or ~~shelf of accumula~~ a mass of ~~mud~~ matter was accumulated to the height of 300 - 400 ft. — forming an elliptical lagoon Island. — ~~at this period~~ ~~the~~ Volcanic action ceased: the covering detritus was consolidated. & the ~~the~~ whole upheaved to present ~~position~~ & greater Elevation:- A mud Volcano in the sea. differs in no respect.

from a Volcano which as on land emits
ashes & Scoriæ. — I have particularly
described this, because I do not recollect
having read any description of one of the class:
at Banks Cove. there is the remains
of a larger & apparently older Crater, in
a much more demolished state: the
Ship is anchored within. — The converging
(a) strata are here very fully developed
& dip beneath the water. where there
is 50 to 100 ft close to the shore:
the rocks is nearly similar: I noticed
in one part of this Crater: the regular
decrement in angle of dip, with proportional
thickening of the strata. towards the basal
margin. — The rather of the Crater
has been broken. by the large seas

(a) The stratification is in parts very highly inclined & most curiously contorted. from inferior irregularities & effects of currents

Setion

Patentus
[illegible]

741 16

one of which is very perfect, with little lake at bottom. — These are partially included, & partially intersect the outline of the grand & older Crater. — All are composed of the stratified Volcanic Sandstone — (or Chatham Isd. we have seen such forming the principal mountains) here they are subordinate to a great hill 2000 – 3000 ft. high. from all parts of which Lava has flowed. — The enormous streams many miles broad. almost utterly destitude of vegetation. I believe I must except two or three Craters: interspersed between & between these last Sandstone Craters: ~~we have~~

Banks Cove 742 17

To the N. for many miles has entered the sea. — It is composed of Trachyte. (& in other respect interesting) about 4 feet from the surface. the rock is more compact, than higher up. (although specimens do not so well show this) consists of very numerous large crysts. of glassy Feldspar imbedded in irregular vesicular black grey base.
— I was surprised to find the
(3247)
Crystals in the very superficies of this sub=aerial current equally well developed [of the Lava]
(3248). — The surface as compared with the Greystone or Basaltic ones of Chatham Isd. is on a large scale much smoother. — there is not that appearance of large frozen billows. or nearly so many fissures of contraction:

743 (18

on a smaller scale. this surface is exceedingly rough. — I should compare this to a lake violently agitated by wind. the other to the ocean. — The liquidity must have been more perfect (a fact believed to be uncommon) the general surface is more level: it has flowed through narrower channels & lastly the edges are infinitely thinner: cavity of the more vesicular fragments: & from one to 203 ft. high. — Very Recent as this stream appears to the eye. — it is covered by in one part by a smaller narrower Black Lava. which has for a minute a perfect Crater on side of Mountain. — The great field of Lava, which has separated the base of the first Sandstone Crater

Bank Cove 744 (19

from the ocean. also has flowed from the same great Volcanic mass. — The Sandstone Craters. must have burst up through streams of subaqueous Lava of Basalt & Trachyte. & we here see the latter very[illegible] there. — Therefore such have alternated. —

Albemarle Island. (greatest of group) consists of as yet four grand mounds. 2000-3000 ft high. joined by Low country formed of Lava streams & studded with little Craters:- Narborough Island. which has an active Volcano. & is more covered with bare Lava than any other we have seen; belongs to this group & is only separated by a narrow arm of the sea:- In Albemarle 2d. in 2d Mound

I believe there are 5 principal Mounds. (1) (in NW corner) Upper Sea. — ~~#~~ (N & S chain)

E. S. Japan. Indefatigable Chat. other parallel line?

from the South. there was steam issuing
from Crater like up:— Near to South West
mound. a fine Crater 2d Cone. just
like at Chatham. Really a side of
mountain. — for a short distance from the
shore no bottom. with 840 ft. —
at Prattle Island large. 2/3 circular
Crater of Sandstone. Going close to main
Island just like 1st. Crater just
described but must not have been:—

There would appear a seen from West coast
5 principal mounds (& one rather smaller one
in N W corner:— (Perhaps 6th N Cone???)

Whilst (1) Crater is coated & mud
near to the bottom which must have
flowed in the air. — Crater (2)
probably was entirely main: for its
sides are worn into cliffs & much
deepened by action of the sea:
& has been rather the large
quality of ashes & cinders thrown:
In Crater 1. The converging is so
small, that perhaps it might have
accumulated even antenna to last
eruptions. — Yet I do not doubt at
last eruption Crater full of Salt Water:

The archipelago of the Galapagos consists of ten
principal Islands; of these five, namely. Albemarle
Narborough. James. Indefatigable & Chatham, considerably
exceed in size the other five, Charles, Hood, Barrington
Bindloes & Abingdon. Besides these, the several
(a) insignificant islets. The archipelago covers a
space of ocean, extending over 125 miles of
Latitude (from 0°.38' N to 1°.27' S.) & 140 of Longitude.
This space, although not the quantity of land, may
be roughly compared to Scicily, conjointly with the
Ionian Isles. All the Islands are strictly
Volcanic in their ~~construction~~ formation, the whole being
composed of Lavas & Volcanic Sandstones. I believe
if every Crater throughout the whole group, was
enumerated the number would certainly amount
to several thousand. Personally I have only
visited four of the Islands, namely. Charles Chatham
James & Albemarle Is.ds. I saw however specimens &
received notices respecting the others, from the various
officers employed in the survey. In my description
I will commence with the most Southern Is.d & so
proceed. Northwards. —

Note (a)

I exclude the small Islands of Culpepper & Wenman, which lie 70 miles to the Northward, from this measurement of the group.—

(a). The archipelago of the Galapagos Isds consists of 10 principal Isds which are scattered over a space equalling in extent the whole of Sicily & the Ionian Isles. — They are strictly Volcanic being entirely composed of Lavas & Volcanic Sandstone. the latter not being very abundant. ~~except in the~~. I will begin with the description of the most Southern Islands & so proceed Northwards. —

Charles Isd. — The highest hill is 1800 ft. its summit is ~~an~~ formed out of the remains of a Crater. the escarpment consists of red glossy scoria. united ~~cemented~~ together. — From this point I counted in different parts of the Island (although its diameter, the figure being nearly circular, is only 8 miles) ~~miles~~ from 35-40 [39] hills, in the summit of all of which there is a more or less perfectly circular depression. — In the lower parts, the Lavas are Basalts. or greystones & more or less Vesicular. — Mr Stokes found on the SW point in another place two streams of bare & rugged Lava. With

I only personally handled a few D^os. Charles. Chatham. Albemarle & James D^o. — I saw specimens & received notices respecting the others from various officers. —

(B). I should suppose in the whole group there must be several thousand Ceders sufficiently perfect to be recognized as such

Charles I.d this, two exceptions, the Is.d is covered with
vegetation & there are no signs of very recent
violence. — On the South side of the Island.
I noticed in many places a beach of large
rounded Rocks. which appeared to me decidedly
to be quite beyond the reach of the Surf
at the present level. — In one spot. there
was a low double cliff. & on the top of
the South a bank of such pebbles. —
Perhaps this raised beach may be. when
highest, 15 ft above the line of present
action. — all the neighbouring
small Is.ds. either consist solely of a Crater. a
a hill surrounded with one. — The walls
are generally much broken down — Mr. Chaffers.
brought me from Chatham Is.d a fossil shell.
3291 which he extracted from Volcanic Sandstone
at the height of 400 - 500 ft. — The whole
hill being composed of this substance. —
Hoods Is.d. Is studded over with small Craters:
in many parts. there are black. naked
streams of Lava. — Its height is 640 ft. —

Chatham I.

The highest land is about 1700 ft. — the South side is steep & appears to consist entirely of Lava. covered with Vegetation. — At the Eastern extremity on both shores there are some mounds of Pumice Sandstone, surrounded by a crater. — a short distance to the West. I examined a smaller one. — having passed over a broad district of Basalt or Greystone. Imbedded over it the interstices filled up by Calcareous Tufa. I came to some small hills in parts detached, in others joined to a central mass. — The strata dipped away from this centre on all sides with much regularity at about an angle of 40°. — In the extended hills the lower strata to the thickness of several hundred feet were composed of a very singular stone; it is termed yellow-coquet. yet is rich, containing some little Calcareous matter & of an imperfectly resinous appearance. — The whole is divided by a strong 3220 3221 crystalline structure & hence is very crumbling.

(a) Specimens of the Semi-Resinous kind, like
(3236 .. 38) — Height of the Hill
800 ft. ——

Chatham 3223 3224 This is covered by a stratified mass from 30-40 ft thick of a coarse harsh brittle brown Volcanic Sandstone. — Both kinds contain occasional fragments of Lava. — In the former stone there was a remarkable appearance in layers of hard stony matter. — These however when examined closely were hard to distinguish from surrounding substance. — They consist of the very same semi-vesicular substance, only 3222 a trifle more compact. — I suppose these must be explained by what Mr Scrope describes as a shrinking of the rock & subsequent secretion from the still partially liquid surrounding matter. — The central mass is a paler & coarser soft Volcanic Sandstone with white 3225 specks; its structure is amorphous. — This substance appears to occupy the hollows of the Crater: Both it & the external parts have been much washed away. The latter only existing as distinct hills. — The Sea at the same time that the lower Lavas were smoothed over with Calcareous Infusorial strata effected this. —

Chatham I. The whole mound is superimposed on the Basalts: in no part we have streams of Lava & only a few fragments. — I cannot doubt that the semi-Resinous stone is a subaqueous sedimentary deposit. — The upper Sandstone may have formed as Mud. subsequently to the Crater having escaped from beneath the Sea. — I mention the latter supposition, because a similar stone will presently be shown thus to have been formed. —

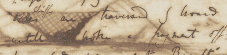
A few miles to the West, there is a hill 520 ft high, forming a bold point in front of the Kicker rock, which is very nearly related in its structure to the last Crater. — It is a broad & large mass. the whole (excepting the centre) is composed of a compact, almost a Cornstone feature, slightly resinous, base, which passes into the above Semi-Resinous substance; in this are many broken Crystals. specks of Pumice & Volcanic glass. Also great quantities of angular & well rounded large pebbles of Basalt. — The state in which these fragments were, almost proves the subaqueous origin of the rock. — At the present time, the sides of the hill, composed of this

3226
3238 (a)
included

(a) The concretionary structure is on a larger scale: hence does not crumble so much: this & the quantity of imbedded fragments is chief difference with the Crater. —

In all these compact subaqueous Mexican Sandstone — there appears to be strong tendency to a Concretionary structure

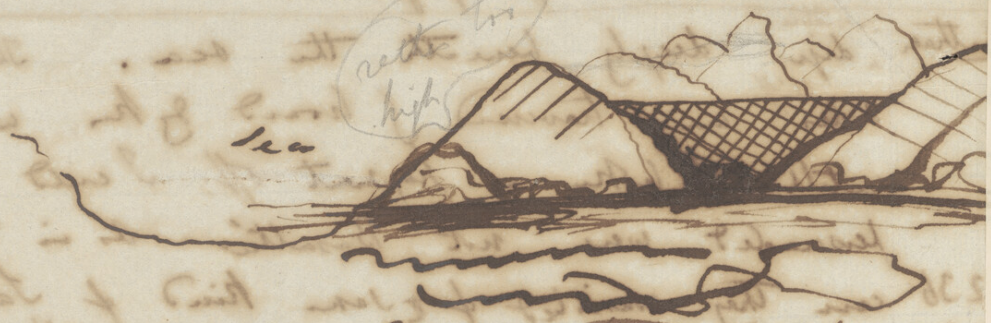
1835
Chatham
3236
3237

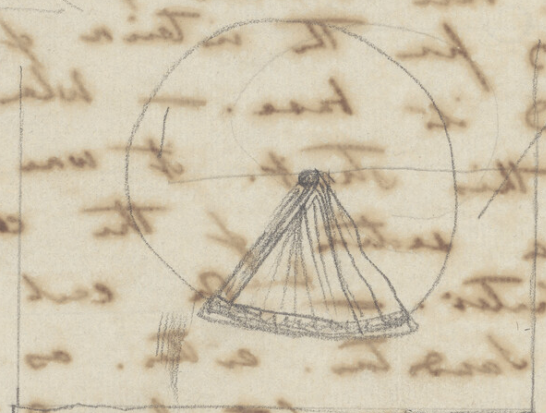


Chatham substance dips deeply beneath the sea. The steep sides cliffs are traversed by broad dykes which until I broke a fragment off, I could not be persuaded were not Basaltic. — As in the former
3236 case they consisted of the same kind of Sandstone,
3237 perhaps a shade harder. — This dike thinned downwards & I believe was filled from above; The mountain subsequently to its emersion has been widely fissured parallel & close to this line; & the fissure is only partially filled up with loose fragments of the Sandstone. —

This hill apparently has until lately existed as an Island instead of as peninsula. the low neck of land is partly formed of bare streams of Lava, which have flowed from the interior of the main Island around its base. — When the sea occupied this strait it wore away & exposed a section of the central parts of the crater. — Hence on each side we have the Sandstone either as more commonly amorphous or with crateriform dips at the high angle of 50 degrees. — in the centre there is a funnel shaped mass of

(a)





Chatham 3235 Basalt. which on its margins. thins out & covers the Sandstone. — The Basalt in central part of stream is very compact. Reddish grey: Colourless Crysts of red Olivine(?) — The upper & inferior surfaces are cellular to some depth. — This Basalt must have existed as a pool of liquid matter within the Basin of the Crater. — The Kicker rock lies a few miles out at sea. from this point. — it is a most singular form. — a flat topped mass. is surrounded by absolutely perpendicular cliffs. & which from the depth of water. must be continued beneath the sea. — On one side is an equally abrupt spire. — Whole height is 400 ft. the whole consists of a Volcanic Sandstone similar to the last described. spot. — I can only account for this figure. by supposing, that the external cones have been removed & that the central mass. which filled up the basin of a former Crater only now is left. —

I have also mentioned how of these Craters. composed of Volcanic Sandstone

Chatham. They form the highest hills in this vicinity: & are of a more ancient date than much of the surrounding superficial Lavas.— As we know in terrestrial Phenomena that may solely or at the close of an eruption eject much finely comminuted ashes; so we may suppose the same to happen in a Submarine one; the ashes here being in the state of hot mud. which would soon be consolidated in regular strata around the orifice.—

How formed

I mentioned a stream of basaic Lava as having flowed around the base of the less Sandstone Crater: Tufa has proceeded from a strange Rock

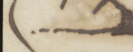
base of the vegetation a distinct studded over with small Craters. so as to resemble those parts of Staffordshire & Shropshire where Iron Foundries are most common— In the space of a few miles I counted upwards of 60.— They arise on the side of an undulating sloping piece of land.— In Mr Scrope's work on Phenomena there is a drawing of the craters in Central France which gives a very good idea / this district. However they are less more numerous & smaller in size.—

Chatham I. The Lavas are of two ages; the surface of the one is entirely destitute of vegetation, the surface exceedingly rugged, & the form like that of a sea petrified in its most tempestuous moments, & cropped by great figures. — The surface of the other is rather smoother, the figures filled up with earth, & partially clothed with a stunted vegetation. — By these characters the streams of the two epochs can be readily distinguished; but taking into consideration the outline alone of form, they could scarcely be traced. — The Craters from which both these sets of streams have proceeded are nearly in the same state of preservation. — Their diameter commonly varys from 30 — to 150 yards. — They are elevated from 50 to 100 ft above the surrounding country. — Generally the ring is perfect, that is after the Lava (which appears to have burst through the base) is perfect has flowed, a mass of scoriæ have been ejected & which have formed the Crater. — The Craters are commonly within ⅓ of a mile from each other. — some much closer, even within 30 yards from rim to rim of distinct & perfect Crater. —. The Crater consists either

(A) (B) (C) (D) V. D. 11 (a)

(a) The inside is nearly as deep as the level of surrounding Lava. —

(B) Near the outer part of stream the fissures are generally parallel to the borders. —

() (section)

(c) I have written to describe the Lava is grey. irregularly vesicular with Olivine (3234/. The irregularity in the form of the cells appears a common character in the part. — In parts there is an obscure prismatic structure & generally frequently the superficial parts are formed of loose cakes. which sound. when a person walks over them. like plates of Iron.

1835
Chatham I.

Chatham I^d: of an irregular pile. or more commonly a ring. of Black or red glossy scoriæ cemented together & mixed with Rapilli & [fragments] of Lava. — There were some Craters of another form. consisting of Mamill-formed hill. composed of a more compact. laminated Lava. with circular Crater & precipitous sides: it appear as if Lava had flowed on all sides at same moment from a point & subsequently that the orifice was ~~blown~~ formed. by a circular central mass being blown up. — In several places. & almost universally at the foot ~~[illegible]~~ of these small Craters. there were nearly circular cavities from 30–60 ft deep & about the size of the smaller Craters. — sides precipitous; from the appearance of sides & bottom I have no doubt these are owing to the roofs of cavities having subsided. — One small Crater had three of these surrounding it. — A case the reverse of this. appears sometimes have happened. when the Lava. when liquid. appear to have been elevated into large bubble. the summit of which having burst

Chatham Is^d

has left irregular & deep cavities. At the Concepcion earthquake volumes of gas burst through the water in the Bay: such happening beneath fluid Lava would cause the above appearance. — Generally where the Lava rises at the base of the Craters there were numerous small well arched gutters from 2 to 4 ft deep. — The roof was generally perfect & entire for considerable distances. —

Mass of the small craters have sent forth such streams of lava:-

Lastly of this district

I was much struck by the reflection how easily the sea would entirely remove these rings of scoriae & from what I have above said how difficult it would then be to distinguish the different streams: the whole would appear as the result of one great eruption from one point: instead from very many points & at least at two epochs. — On the South side of the Island. There is no Craterized district which appears as recent as this does. — Towards the West end of the Is^d. I landed in two places: in the both we had a black

Nature of lavas age of lava

3239 Basalt more or less vesicular & containing in some places a good deal of Olivine.

Chatham Isd. In one station. the ~~surface~~ outline of the Lava was very irregular although well clothed with low trees; in the other. the country was smoother & I believe the ∫ Lava subaqueous, having flowed into shoal sea. — Anyhow in a cliff at this place. at a height of several ft above high water mark a breccia. of huge fragments of vesicular & compact Basalt were united by a hard calcareous sandstone. In this were fragment of recent shells. I extracted the common Fissurella, Arca, & plates of
3290 a Chiton: all of which abound on the Beaches: The Calcareous matter had filled some of the cells of the more porous kinds of stone.
Here we have a proof of elevation to a small degree. within recent times. & which corroborates the fact of the dry pebble Beaches at Charles Isle. — Indeed; I believe, traces of a similar fact may be traced on the shores of this Isd. —

At Barrington & Indefatigable Isd. I hear of very little true Lava. — but of abundant Craters. glossy scoriae. arched. gutters. & that the both

are entirely Volcanic. —

Albemarle Id. — is the largest in the Archipelago its length is upwards of 70 miles. — it is narrow in proportion & is composed of five great principal mounds. (& some smaller ones) which are joined by low land. — These mounds from form would appear to be surmounted by enormous Craters. from which have a black streams of Lava can be traced down their sides; — The

the others between 3-4000 ft
(a)

(a) they are 1/5 the one exceeding 4000 ft.

intermediate low necks of land & the flanks of the mountains are studded over with Craters. — I saw one point even more tuberculated than the district of Chatham Id. — Many of these appear to have been in recent action.

Narborough Id. (3720 ft) consists of one such mound it is separated only by a narrow straight from Albemarle Id. — Its sides are seared with naked Lavas, perhaps to a greater degree than anywhere excepting the East side of the central one of Albemarle Id.

Ex These two Islands are the only ones in which there are accounts

1735

Alternate D

(a)

the Sea. at SW extremity is 4700 ft. to which may be added at least another 1000 ft.; for at that depth close to the shores. no soundings could be obtained: of the other mounds, Mean Hill is 3720. & Whale Hill 3730. & which height agree in a surprising manner with that of Scarborough. D. nearly 3720. ft.

The internal diameter is 1 mile

Albermarle Is.d

of eruptions. We saw a Crater smoking in Albermarle
& in Narborough. such has frequently been seen.
Capt. Pipon saw two in action at the
time. — During the short period. men
have lived on Charles & James Is.ds an
Earthquake has never been felt. —

The internal diameter is 1 mile

at the SE extremity there is a small rattling
Isl.d. (Brattle Is.d) in the form of a crescent.
some small Is.ds almost trace the circle of
the Crater. — it appears entirely composed
of Sandstone. the strata dip from the
common centre at about 45°. —
In front of Narborough Is.d there is a small cone
(Banks cove) which is seated in the midst
of Sandstone Cliffs. — I examined me a mile
to the South with ease. — The Crater is elliptic:
the longer axis runs N & S & is perhaps 3/4 of a
mile long & 2/3 broad. — The sides are of
nearly equal height; at the bottom, which
is about 500 ft deep, there is deep lake
of very salt water. — This can be only slightly
elevated above the level of the sea. — In
its middle there

Abingdon Is.ds are three Islands: in one of which a small
crater is very evident. — The crater has
an opening to the S.W. or Leeward. — an immense
stream of Lava from the mountain behind
has crossed the mouth & has formed part of
its contents inwards & part towards the Sea.—
In the whole circumference of the escarpment
of the crater the rocks are Volcanic Sandstones.
There generally are of a brown or yellow color
3249 light & brittle. Frequently there is a pisolitic
3250 structure: the balls from size of shot to small
bullets, formed of thin concentric layers of the
finer particles of the sandstone. — In
the lower parts of the strata. I noticed some
compacter varieties. — In the sandstones there
are abundant broken crystals of glassy Feldspar
& Olivine. — In all parts very many large
& small imperfectly rounded fragments of cellular
& very compact greystone. Basalt & much
vesicular Trachyte. — These pieces are
arranged in layers. I saw some strata almost
entirely composed of such. — The whole

of the grand circle of sandstone is thinly stratified. all the strata dipping from 25 to 33° from the centre of crater. — In no part is there a stream of Lava; but from the numerous fragments it is evident the Volcanic eruptions must have burst through such. The external sides of the crater slope up regularly at about same angle as the Strata — They are furrowed or radiated at very regular distances from the lip of the crater to the base. This is caused by longitudinal dooms (from 6 to 20 & even 40 ft wide) which are separated from each other by gullies. The dooms are not marked from the excavation of these intervening spaces, because the strata of each corresponds with the external curvature. — The gullies no doubt have been deepened by alluvial action. — The appearance of the greater number is that of the top of a plastered vaulted passage; the plaster being red, cracked & frequently separating in plates. —

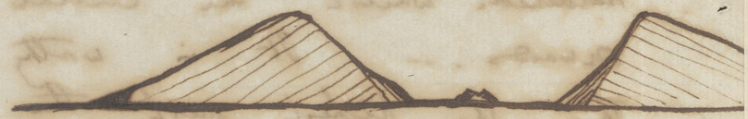
Albemarle Is.d

some of the archways may reach half way down the hill: the intervening gullies uniting. the appearance does not differ from the ordinary furrows impressed by the drainage of Rain water. — High up, these doors are sometimes really arched hollow channels. Both their size & structure & appearance is identical with those of Basalt described at Chatham Is.d — They are not however nearly so continuous hollow. — at the very lips of the crater, they present the form of little holes. the entrance being more or less clear. — Also on the external slope & mouth of crater, there are numerous slightly tortuous gullies from 1-2 ft wide. formed of sandstone, & appearing as if made by man to conduct a fluid. — There can be no doubt from this description but what this has been a Mud Volcano: from the even edge the boiling thick mass has poured over in narrow streams. From evaporation & cooling the upper surface has occasionally

hardened. whilst the central parts have flowed onwards. — It is worthy of remark that in this the highest part the primitive structure is well developed. — From the outline the archways & gutters being preserved entire. it is manifest the volcanic mud flowed over the sides beneath the air & removed from the action of the sea. — Yet from the structure of some of the lower strata I suspect they are of subaqueous origin. — With this view perhaps the following fact may have some connection. — Within the crater. in a few spots. there is a casing of Sandstone. which dips towards the centre of crater. — This is of the same nature but rather compacter — as the former kinds. the casing is thin & reaches to a height from 100 - 150 ft. — It may be described as a consolidated stratified lake. — The strata were inclined at the high angle of 36°; it was remarkable that little or no thickening could be perceived in the part of these strata. which were visible. — at the foot of the Escarpment (a) there were also large piles of loose detrited

(a/

Section



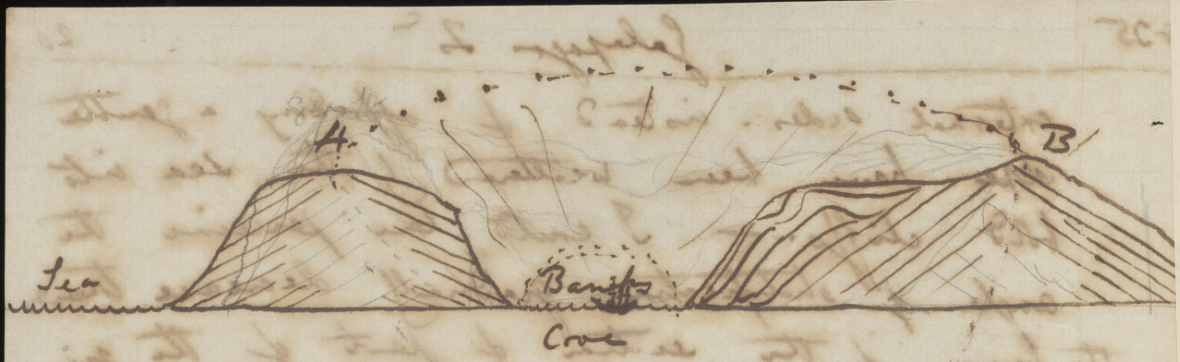
Albemarle I.d

but of a very different structure. — If there strata were not deposited when the sea perhaps occupied this crater, they must be owing to the following Volcanic mud, which was not ejected at the last eruption. —

From the present level of the lake in Crater, from the steepness of the inner & form of the mouth. — from the probability of a small horizontal upheaval if — very probable far from unlikely that the sea did once occupy the lower part. —

At Banks Cove the Beagle was anchored within a crater larger even than one described, but in a much more demolished state. Within the outer ring, there is one (or I believe another) very perfect & not very small Crater, with a salt lake at its bottom elevated a few feet above the sea. — The walls are composed of Volcanic Sand-stone of the same nature, but when I examined, much coarser & harder & having more the appearance of a true subaqueous deposit. — The highest part is about 700 ft: the

external sides. instead of affording a gentle slope have been weathered into bold cliffs. — I could distinctly perceive the angle of stratification gradually decrease towards the base of the central part of the rim. & with this decrease the beds thickened. In this part also there was a much larger proportion of coarse fragments of Lava. Within the circle of the Crater there is nearly as much sandstone which has a converging stratification or strata dipping towards the centre, as there is of that which dips externally: Hence the rim of the Crater is like the roof of a house: The stratification of the internal part is often very irregular. either from the effects of currents or inequalities: it is in places very highly inclined. so that in the cove there will be close to the shore from 50 — 100 ft depth of Water. — I can feel no doubt that the whole of this Island is the work of a submarine Volcano. — & that the internal converging Sand &c



Section of the Crater.

Illustrating

A & B The Rim of crater.

Albemarle Id was deposited subsequently to the last
period of activity: that horizontal upheaval
which is also of the [illegible] in the case of the principal cones
have given it its present height; during
which time the Sea has been wearing
away much of the Crater & which
action is still continuing both from
within & without. — I have particularly
described these Craters because I do not recollect
having read of an exactly parallel case. — nor
indeed of a large Crater entirely composed of
Volcanic Sandstone under any circumstances.
All the facts described are what one would suppose
a priori would take place have resulted from Volcanos
situated as these appear to have been. —
At Chatham Id. the Sandstone Craters have
been the principal points of eruption in their
respective districts: here they are [illegible] between 3 & 4 thousand
subordinate to a great mound. [illegible] ft high,
at the foot of which they stand. —
From this great Volcano torrents of Lava,
have flowed. both from its summit & lateral
small Craters. —

Albemarle I.

An enormous stream, many miles broad, almost entirely destitute of vegetation (I believe I must except 2 or 3 plants of a Cactus) interspersed behind & between the Sandstone Craters. — It entered the sea. — The width of this Lava is finely characterized Trachyte. About four feet below the surface the rock is irregularly vesicular, Pinkish grey, & abounding with Crystals of fractured glassy Feldspar. — The very surface is composed of the same rock, only slightly more vesicular & with equally large Crystals. — The outline of the field of Lava as compared to the Basaltic one of Chatham I. is much smoother. — there is not that appearance of huge forest trees. or near so many fissures of contraction. On the contrary the surface itself is excessively rough. — I should compare the one to the ocean, the other to a lake violently agitated by a Storm. — The liquidity of this Lava must have been more perfect. — The fact is believed to be uncommon. — I judge of it from

3247

3248

Abbreviate to

these facts; the general surface is more horizontal: it has flowed through narrower channels & lastly the edges of the stream are infinitely thinner. — They consist of fragments of the more vesicular beds. one foot to two or three feet high. — Very recent as this Lava appears to the eye, it is crossed in one part by a ribbon of Harder Lava which has flowed from a minute & perfect crater high up on sides of mountain. — As the Sandstone Craters are seen to have burst through & ejected fragments of Trachyte & Basalt: it is probable they alternate. From the abundance of the former rock & the predominant direction of the described Stream of Lava. I should suppose this Stream is essentially a Trachytic one. —

(a) James I. The only part of this Island which I examined is the west side. — The country here gradually slopes upwards to an elevation of about 3000 ft. — The whole is Trachytic Lava: the streams do not appear modern

(a) The extreme great north mound on Albemarle Id. is between 3 + 4000 ft high. — The external rim of the Crater fixed by the triangulation of the Survey. has a diameter of 3.8 miles. — The other Craters in this island to the South have even greater dimensions.

James Is.d

as they are well clothed with Vegetation. The streams as seen in the Beach are generally three & are separated by scoria. In several parts there are old broken down craters & in the central highest part (or between 2-3000 ft high estimated) of Is.d - about 8 miles inland - there is a large & perfect crater circular. sides very precipitous. & bottom filled with wooded In the vicinity hereof, but Trachytic Lava is found: the channels by which the Lava has flowed over the rim are yet visible. — The walls of the crater are chiefly composed of light red & very old scoria united together. — The Trachytic Lavas in the lower parts of the Is.d are very cellular & the imbedded Crystals of glassy Felspar very large & abundant: - In the higher central part the rock generally is more compact, the base blackish grey with scarcely any Crystals & or they are abundant & small, the basis itself being Crystalline. —

3265
3266
with Olivine?
!
3267
3268

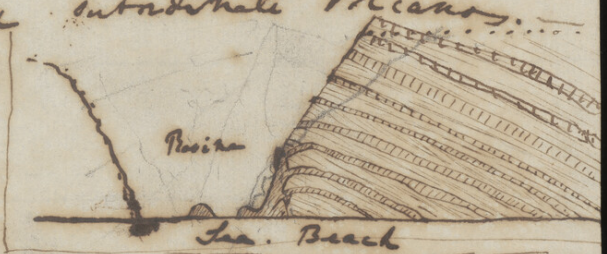
A small bay close to Albanie Is.d is formed on its N.E side by a promontory which would appear to be slip out of centre. [sketch] of an old

James Id crater. the both sides being worn into precipitous cliffs by the action of the sea. — There is however some confusion in its structure. — The exterior diverging layers are almost solely composed of coarser & finer fragments. of red glossy scoria. rapilli. fragments of Trachyte & their detritus. — In one part of the pile. there were numerous a large fragments of a harsh red Claystone base, containing small bright red earthy specks. more or less vesicular & a varying

3275 very compact- quantity of glassy Feldspar Crystals. — I did not succeed in finding any stream of this Lava. although somewhere such must be in large quantity. The fragments in the various layers are but little rounded & scarcely at all agglutinated together. In the higher parts. there were some fine & so well arranged paper-like layers of consolidated pumiceous. dust; that I at first imagined they must have been of subaqueous deposition. — Immediately beneath these. there was a thin stratum of very small. & weathered fragments of Rapilli; with them were thousands of a small Bulimi. the shell in an excessive state of decomposition. —

James Isd — when these shells were alive; this layer must have formed the base surface of the Volcano. This proves the terrestrial origin of at least all the upper parts of the Promontory. — In the lowest part middle between the diverging piles there is a nearly horizontal bed of Lava, which thins out at its edges & appears to have filled up forming the bosom of the Crater. — The stone is a compact. blackish (It is about 200 ft thick) (3267:18 like) or greenish with but few Cryst of glassy Feldspar; Its lower surface to the thickness of about 2 ft. where it lies on the Volcanic detritus is an aqueo-cemented mass of fragments; these consist of the same substance, slightly & finely cellular & containing larger & more numerous Cryst of glassy Feldspar than the compacter kinds. — The piles of scoriæ are traversed in several places by great broad dykes, ~~which are~~ many yards thick, which run vertically for considerable distances. — They consist of a grey compact Trachyte. with very few Crystals of Fed.
3279 the sides & certain spots are cellular. — Parts of these dykes. stand out isolated in the

James Is. sea. forming off a singular pinnacles. The sea, when receiving the loose fragments on either hand. has been unable to remove these. & they now point out some of the limits of the former crater. — In the plain of diverging strata there are some small Lava streams; these probably have flowed from a pit of crumbling in one of the grand dykes. — at a spot where a small ravine enters on the Beach; we have two sections at right angles to each other. — The corner, or the line of junction the two, falls on the very centre of one of these small subordinate Volcanos.



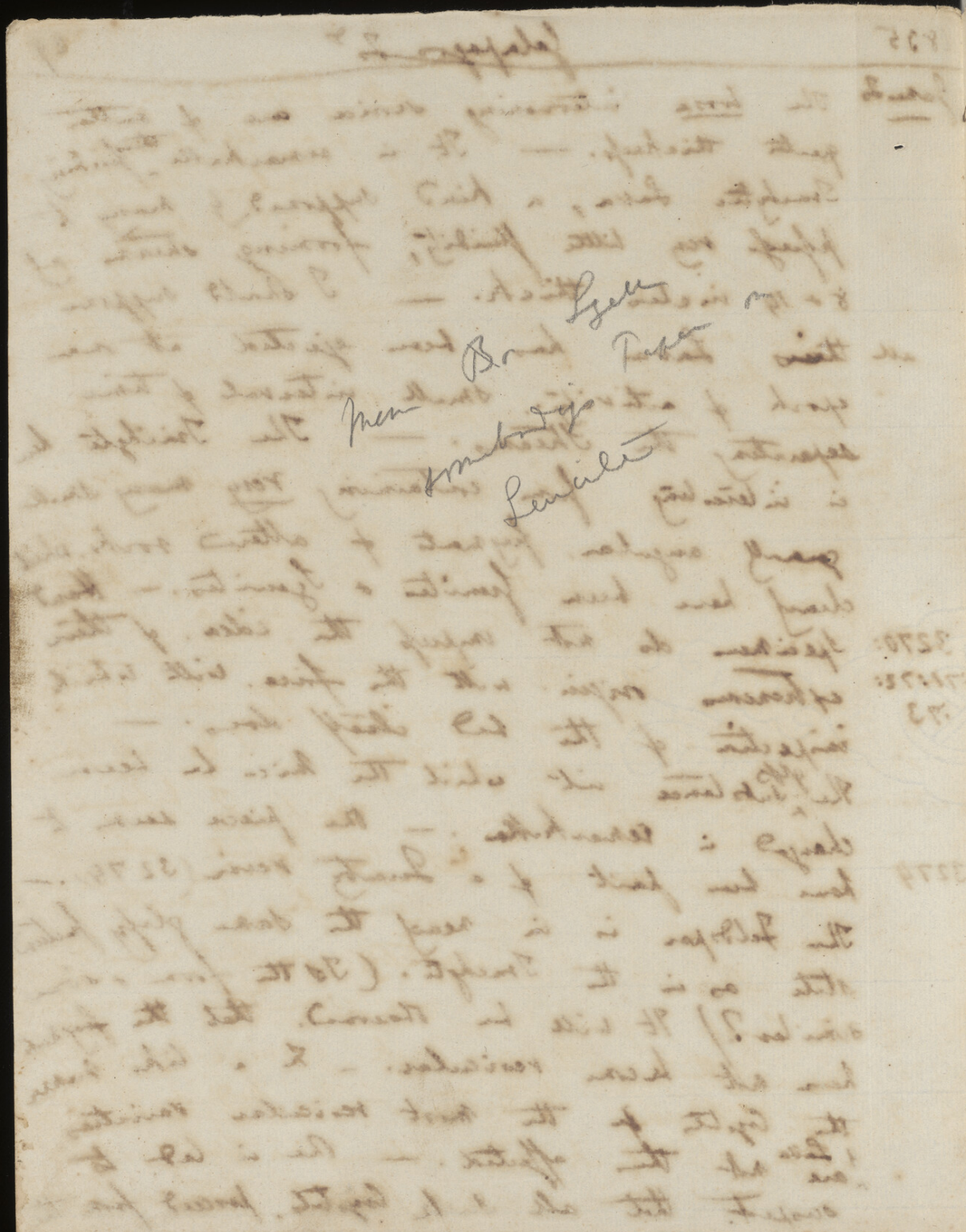
I have drawn the section which faces the Sea Beach. — On the coast there are two or three

3278 little detached peaks of a brown. small cellular Trachyte. — One of them rises to the height of 15 ft; is very irregular in form & make the basal part of the corner. — In actual junction with it three small streams of Lava. bends upwards as if over the rim of the Crater. & then slope

James 2d

continuously downwards. (As I have drawn the point it is too regular.) Above there are 6 more thin streams, which are not now joined to the column of Trachyte. — These streams are very diminutive upwards. (part seen in the Ravine section) They have an extension of about from 10–15 yards; downwards from 60–80. — It must be remembered this eruption took place on the slope of the greater Volcano. — The thickness of the streams corresponds to their small lengths. — They all consist of a highly cellular grey base abounding with large & numerous Cysts of glassy Feldspar. — The outer surfaces for about 2–4 inches deep is converted into bright red glassy scoria. — Small loose fragments of such scoria 3269 separate the streams. — I measured one, of which the dark Trachytic part was of 8 inches thick, to which may be added 6 inches for the superficial external coatings of red cindery matter, giving 14. for total thickness. & this is the dimension for the whole length. — Another, for a space was altogether only 8 inches. — The rest from one to three ft:

James I. The loose intervening scoria are of rather greater thickness. — It is remarkable thus finding Trachytic Lava, a kind supposed by many to possess very little fluidity, forming streams only 8 or 14 inches thick. — I should suppose all these Lava has been ejected at one epoch of activity. small intervals of time separating the Streams. — The Trachyte here is interesting from containing very many small generally angular, fragments of altered rocks. which clearly have been Granites & Syenites. — Hand 3270: specimens do not impress the idea of their :71:72: ephemeral origin. with the fire. with which :73 inspection of the Lid itself does. — The glassy substance into which the mica has been changed is remarkable. — One piece seems to 3274 have been part of a Quartz vein (3274). — The Feldspar is in nearly the same glassy fractured state as in the Trachyte. (Is the form also similar?) It will be observed. that the fragments have not become vesicular. — In a like manner the Crystals in the most vesicular varieties of Lava are not thus affected. — We is led to suspect that all such Crystals. proceed from the



James Is. Granite or that they are not produced in the liquid Lava. — Inspection of a specimen of a cindery. regularly & highly vesicular Trachyte.
3288 brought from Abingdon I by Mr Chaffers. where the Crystals are very large & perfect. will tell more on this side of the argument. than any description. — Yet I am unwilling to take up this opinion: If the Trachyte is melted Granite. the quartz & Mica has formed the more fusible part: — In the fused mass, when at an intense heat, does not the quartz & a small portion of the other ingredients form the Crystals of glassy Feldspar. — May not these Crystallize at a temperature when the other rest of the matter is fluid? This will explain the imbedded Crystals. — I do not however understand the observation, which I believe to be exact, viz that the Crystals abound more in the more Vesicular varieties. —

[margin: which forms composing the matrix for is glassy Feldspar.]
[margin: a extraneous appearance in any point of view]

To return to the Promontory, on the inland side the layers of scoria are covered & encased
3276
3277 by a thinly stratified dark greenish-brown, light brittle. Volcanic Sandstone. — The bed is from 10 to 20 ft thick: it contains a few large, rather angular. fragments of Lava: its

James Id.

structure is in many places highly pisolitic. — The Sandstone overlies the red detritus & scoria. without any passage in the nature of the two. — In the basin of Crater rests on the Solid Trachyte: from this it slopes over the rim of Crater & covers the external slope with a nearly uniform ~~slope~~ sheet. I observed however here traces of three longitudinal convex furrows, which may be compared to the rings on the shell of the Pecten. — To the South & at head of the cove, there are other old Craters. the upper strata of all of which resemble this Sandstone. The lines of curvature from these different hills join, as if the Sandstone was one envelope. — I did not actually trace the unbroken strata. — at first with the consideration of this, of ~~with~~ the stratified nature. & thin outline; compactness as compared to underlying scoria, & the sudden change in composition. I was perplexed concerning its origin. As it settles the cinders with the Bulimi it must be terrestrial (which I originally doubted). hence either streams of mud have flowed out like Lava

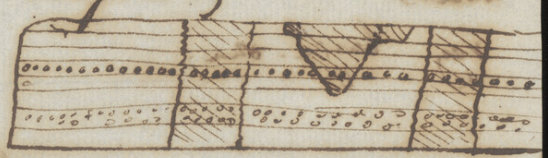
[illegible]

James Is^d. from the Craters. or Ashes having fallen, has been consolidated by subsequent torrents of rain.— The latter supposition will not explain the longitudinal arches, hence we are reduced to Mud eruptions. (a)
I may observe, that cases might arise, which would cause much difficulty.— for instance parts of such mud entering the sea. &c &c.—
I have already alluded to a Volcanic hill, on the opposite or South side of the Bay. Harbour: it is the highest (850 ft) in the neighbourhead; is surmounted by remains of a large Crater.— The whole is composed of Volcanic Sandstone, full of fragments of Lava, which abound to such a degree, that some layers are composed of them.— The outside is worn into high & steep cliffs: which are continued deeply beneath the sea.— I do not doubt, from the appearance & hardness of these Strata that they are of subaqueous origin.— I observed one fact in the Sandstone, which as it bears an analogy to a somewhat similar fact. described at P. Huapilenou, Chiloe— I will mention.— In one part of the steep cliff, where the Sandstone was yellower, finer grained & softer, there were Dyke shaped masses with vertical. & parallel sides,

(a) It is true such might be produced to a certain extent by the mud carried by the Rain flowing down the hill sides. —
It may be doubted if the stratified appearance structure would be produced. —
Yes it perfectly is. as seen in the Delta of Ascension: the whole question must be considered with care, but the hollow channels afford a heavy argument in favor of mud eruptions. —

James Is.

a stone irregular wedge shaped. of a darker colour & harder kind. which in consequence projected in relief. — The change is rendered the more remarkable by lines of gravel of different degrees of coarseness. existing both kinds. — When I state this. I must add that sometimes there is a trifling irregularity at the points of junction:



The line of junction has very frequently a serrated margin. The appearance is as if some fluid had percolated through fissures & altered the rock to a certain distance on each side. — On close inspection I did not think such an explanation admissible: But rather it must be owing to some (a) current flowing longitudinally from the higher towards base of slope. thus slightly altering texture of depositions. —

a frequent constant

About five miles to the South of the above described localities. (at Puerto Grande), there is a field of Lava about 4 miles long & 1-2 broad.

(a) This is chiefly grounded from the irregular
Ridges depending in their upper parts into the
regular overlapping strata.

The sections of craters with their strata
dipping away from common centers or all
sides shows very regular arches one within
the other: if the section reaches deeply
towards the rim the arch is a right
very large one

James I^d which is bare & utterly destitute of vegetation, & the surface glossy — the sides of the little Fissures which have acted as Fumaroles are yet white. — Recent as this stream appears it is covered by another one, of a slightly darker colour, but same constitution. — ~~Close~~ Close to a ~~[illegible]~~ wall within the marginal fragments of this stream some few but old trees are growing. I conceive there must have been killed if they had been there when the Lava flowed. Hence we see how long the surface has resisted decomposition; to this day it is fresh & glossy. — The Lava is a Greystone, which abounds in a very remarkable degree with Olivine, is generally very vesicular & sometimes of rather a darker colour. — The Basis is nearly the same as in the Trachytes; the Olivine here appears to replaces glossy ~~Feldspar~~ — The surface is smoother than in the Basalt of Chatham I^d. yet here there are great waves & fissures. The superficies itself has assumed singular ringed & twisted forms, which resemble cables, folds in thick drapery & rugged bark.

[Margin notes:] Scope for ... Dogs ... Vol IV p 337 ... 3280 ... 3281 "and have been fruitful ... and ... things nothing had happened to them ... deluged with fire!!"

January 29

These streams of Lava have burst from several small Craters placed at the base of the high central Trachytic hills. — Near to the Sea, a small Crater of glossy scoriæ & fragments has been nearly blown & almost concealed beneath the flood of stone. About 1½ mile from the Beach, there is a Salina which is worked for Salt. — It occurs in a Crater, round the base of which the Lava field has flowed. — The Crater in diameter is about ⅓ mile wide; is circular, sides very steep & beautifully regular. The Rim is rather higher on one side, where it is about 400 ft above the basin, than on the other: but is no where broken down. — The Crater is much deeper than the surrounding country, indeed on the SE side, streams of ancient Volcanic Lava have nearly brought the country up to a level with the brink. The whole upper part of the walls is composed of a compact glossy yellowish-brown Volcanic (a) 3282 Sandstone; some of it has a semi-Resinous 3283 fracture & contains small glossy felspar & green

(a) Has a sub-concretionary structure

1885

James I.d

that of Chatham I.d. Lower down there is the lower ordinary Volcanic Sandstone with a pisolitic structure. The whole contains fragments of Lava & I do not doubt is of subaqueous origin. Such Sandstones compose $\frac{2}{3}$ of depth of sides of Crater. the lowest third is much steeper & nearly precipitous. — so that the Crater at its upper margin is marked in its whole circumference by a kind of ring. This lower third is composed of an Olivine Gregstone Lava. — It would appear, as if the whole bottom of the Crater, in which was to be a lake of solid Lava had been blown up & that subsequently a great emission of water beneath the water had formed the upper $\frac{2}{3}$ of unbroken rim. — The Basin of the Crater is now occupied by a lake of brine round which there is a green margin of saliferous plants. The aspect of this & steep wooded sides have rather a pic-turesque appearance. — The lake is from 6 – 12 inches deep, it never dryes. the water rests on a layer of pure Salt. —

James Is.

The Salt is quarried from the central parts of the lake; the margins being soft & muddy. (a circumstance which happens in most Salinas). — There are three or four layers, each about 3 inches thick; they are separated from each other & rest on impure earthy layers of salt. Some of the Salt is Crystallized in beautiful cubes, nearly 2 inches ~~long~~ in the square. — Is the Salt a Volcanic exhalation? Or when the water was close to & on the level of the Sea. did the Salt water percolate into it & deposit the Salt. — Perhaps an analysis of the Brine may throw some light on this. — At the distance of 2-3 miles there is another hill of similar appearance, but in the crater of which there is said to be another Salina. — Still closer there is a more lofty hill, than either, entirely composed of Volcanic Sandstone. Mr Sulivan informs me the crater is dry, but beautifully perfect; its depth is about 600 ft, the bottom appearing on a level with the ~~side~~ a good deal lower than the surrounding country. — The Sandstone, belonging

Dartmoor Vol I p 189. Mud volcanos & salses called "Salses from quality of salt.

(a)

1311 Jim label

(1200 ft)

circular.

(a) Mr Sullivan informs me that there is a small Is.d on the S East end of James Is.d which consists of a more circular ridge of Silurian Sandstone its diameter is 1/3 of mile. — is very low towards the South. but not fairly broken through. it contains a shallow lake of water which appears to rest on Salt. This Water appears to be on same level with the Sea. — He has seen another crater in which the sea enters at any at time of high water. —

1855

James Is.d

(a)

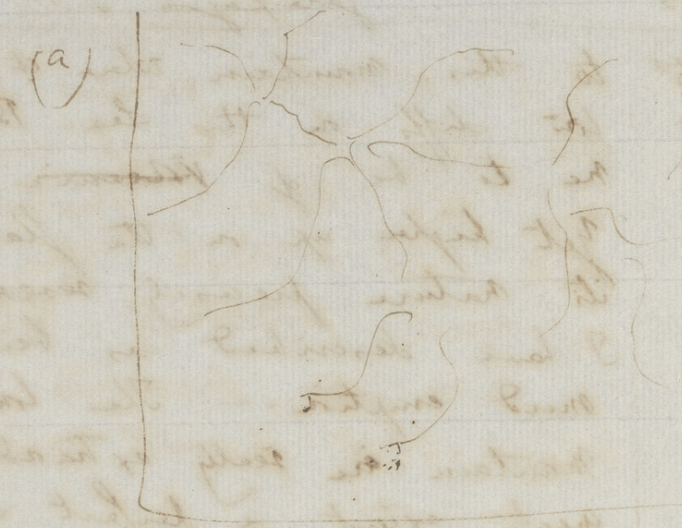
Birdlace

3286

James I.s — to this mountain, where it is exposed in the low cliffs on the Sea-Beach, appears to me to be of ~~Volcanic~~ subaqueous origin. — Yet higher up on the flanks of the mountain, its nature precisely resembles that, of which I have described as being a terrestrial mud eruption. — The lower slopes of this mountain are really extraordinary, for the great extent & perfect smoothness of the folding layers of this substance. It precisely resembles an immense plastered floor. — The smoothness is only interrupted (a) by small & very narrow branching cracks

Mr Chaffers communicated to me ~~the~~ following information respecting the following Islands

Bindloes I.d. — The Volcanic rocks appear very recent & are only in a few places clothed with Vegetation: The component rock is a jet black, glassy scoria: 3286 which has assumed the various forms of melted lead poured into water. — it must have been reduced into a state of very complete fusion. — I saw also specimens of fine characterized Trachyte. — There is a deep crater also of Volcanic Sandstone; out of



Bindloes Is.d (3292) which. Mr Chaffers procured 3 species of shells, & saw many fragments of an Oyster. I am aware that Recent and tertiary shells might still exist: but I think there is at least an equal probability that the Sandstone is a submarine deposition & has been subsequently raised to its present elevation of about 300 ft.

Indefatigable Is.d 3287 Indefatigable Is.d is remarkable for its brownness & flatness & apparently not containing a single Crater: is composed of rather thin strata of a brownish very cellular (minutely Trachytic?) Lava.

Abingdon Is.d 3288 3289 The commonest rock is a reddish brown very cellular; cells small & regular, in bedding vast masses of very large Crystals of glassy Felspar: a thick lava stream mentioned. There is another kind, heavier, more compact, almost composed of less fractured Crystals of glassy Felspar, separated by angular cavities. —

Culpepper & Wenmans Is.ds In this Is.d I saw also a large Sandstone Crater. are situated about 70 miles to the North of the Archipelago. — They both show remains of having an ancient Crater & consist of hard rocks. —

Considering the Islands in the whole Archipelago; it may be remarked, that the Southern ones appear to be entirely composed of Basalt & Greystone. whilst the Northern division is more essentially Trachytic. — In both of them formations, the remarkable Sandstone craters are common. Mud eruptions have generally taken place exclusively in Trachyte; the Salina in James Is.d offers a well marked exception. — These Sandstone craters offer the most remarkable phenomena in the Geology of the group. — It must not be supposed that I have seen a quarter of their number. or that I have described all I have seen. Their presence is the more remarkable. as no where did I see ashes on the surface of the land. — I heard however of one instance when such fell a board a vessel near James Is.d — Wherever the surface of (a) the more recent streams of Lava. appears to resist decomposition for a singular length of time. — It certainly is strange that such rocks should give rise to Mud

(a) I saw no where a well-formed column in the various sections of the Lavas.—

eruptions. — It may perhaps be observed, that, perhaps
those Sandstone which I believe have been
of subaqueous origin posses a concretionary or
nodular structure & those which have flowed
on land, a Pisolitic one. —
The idea of the submarine origin of much of this
Sandstone, necessary presupposes an horizontal elevation
to account for their present position. If the
shells found by Mr Chasseurs at considerable elevations
are not considered as proofs; yet
we have shown in the Northern division, that
such has taken place at least to a small
degree. — In my own mind I can feel no
hesitation about the extension of the fact. —
The vast & almost infinite numbers of craters,
with which all the Islands are studded,
gives them a singular & highly characteristic
aspect. — There is one very interesting
observation made by Mr Stokes Sullivan &
Chasseurs — in their repeating journey
namely that all the craters
are open on the low part of their
circumference, or have the low part of their
circumference on the South side. — This
is more especially manifest in the
small Islands which consist solely of the

There is one very interesting Observation made in their respective surveys by Mr. Stokes, Sulivan & Chaffers, namely that all the craters have their Southern side, either entirely broken down & removed, or much lower than the other parts of the circumference. In the beginning of this Chapter, I have mentioned the extraordinary numbers of the craters scattered throughout the group: these may be divided into three classes, firstly, the immense caldron-like orifices of the Albemarle, which form the higher & central parts of the main Islands; secondly the numerous minute craters which have only poured forth one or two streams of stony lavas; & lastly, the craters composed of sandstone, these in dimensions are generally intermediate between the two first classes. — It is amongst this latter kind of craters & especially when such happen to form outlying Islets that the fact, of the Southern side being most broken down, has invariably been observed. The following eleven islands are all more or less perfectly crescent shaped; the Southern half, having been almost entirely removed. Bartolomé I., which

Jervis is the largest & most perfect; the internal diameter of the Crater, being one mile; the three Crossman's & Enchanted Is: these four are situated to the Southward & Eastward of Albemarle I: Gardner, Champion & Enderby near Charles I.: two small islets near Hood I. & one near James I. Mr Sullivan also informs me that the Small Islet which has been described, as containing a Salt-lake, has a part of the Southern side of the circular ridge not higher than 20 ft, whilst the remainder is perhaps 300 ft above the level of the Sea. Of the Sandstone Craters, situated on dry land, I can enumerate sixteen, which have the sides facing the South either quite open or much lower, than the other parts of the Circumference. Charles I. has two: Chatham two: Albemarle three: James six: Bindloes two: Abingdon one. — One of these in James & another in Chatham I. have their Northern sides low, but not so low as the Southern. — Thus altogether 28 instances have been adduced: in all these cases the low part is directed from SE to SW; I know of no certain exception

to this law, although probably some must occur. I must however observe ~~that~~ with respect to the 16 craters (at forming Islands), that as my accounts of some, was received from officers who necessarily paid more attention to the figure than the constitution of the land, I feel doubtful whether two or even three are not Lava, instead of Sandstone craters. It must be remembered that the law does not appear, for examples are deficient, to extend to those Craters composed of solid Lava: I know certainly of three such, being open to the Southward, but likewise of an equal number, which are directed to different opposite points. — The explanation of the apparently most strange circumstance of all the craters over a large district being broken down in one direction, does not appear difficult. Throughout the islands of the archipelago, both the sea, from the trade wind & the long swell of the Great Ocean constantly unite their unwearied forces against the Southern shores. Hence, that side, especially in the more exposed Islands, is bold.

N B. The trade wind has affected the forms of the craters at Ascension, & must in a like manner have produced an original weakness on one side in these cases.—

a precipitous whilst the northern shores approach the sea with a gradual slope. Taking into consideration the soft nature of the Sandstones, their probable subaqueous origin a progressive emersion; it would be strange, if these craters did not bear witness of this united state, in a manner even more evident than the hard Lava rocks, on which side the ocean has exerted its powerful, unceasing action. — All the craters in a large Archipelago, thus having one certain side high & the opposite low or broken down, immediately calls to mind the nearly parallel fact in the Lagoon Islands in another part of the Pacific. I am so much the more bound to point out this coincidence, as I am no believer in the theory of Lagoon I. being based on the circular ridges of submarine craters. — It is well known, that the opening & low parts of those Islands, is with respect to the direction of the wind, on the Leeward side; the surf however from the S.W. swell is nearly as great on that, as on the windward side; in this respect therefore the (a) case of the Sandstone craters is not entirely similar to that of the Lagoon I.s

(a)
There is another circumstance, connected with this subject, which is of some interest. Five of the great Volcanic mounds of Albemarle & Narborough Isd^s, which are surmounted by Craters having a diameter of between two & three miles, appear to the eye to be of an equal elevation. Three have been measured by angular observations: two in Albemarle I. are respectively 3720 & 3730 ft. & that of Narborough I. 3720 ft. high. — Inspecting the chart, one is tempted to exclaim; on such foundations, ready placed at an equal height, the Lithophytes might soon raise to the surface, their circular ridges of Coral rock. —

Having alluded to the subject of the Coral formations
~~When next speaking on this subject~~ I must
notice the entire absence of all such
Reefs amongst them Islands. — Islands which
are situated in the Pacifick & under the
Equator. — Is it owing to a deficiency of
(a) Calcareous matter? at James Is.d from the
fragments contained in the Lava. it would
appear that the fundemental rock is granitic.
Does such extend under whole group? If
so, does this account for the absence of
a matter so common in Volcanic countries?

Capt Fitz Roy has suggested that the Cold water, which
occasionally is brought up from the under currents
& reduces the temperature of the Sea, a thing
shown, to a degree, perhaps unparalleled in such
a Latitude, may account for this
absence. if a tribe of Animals, which seem
~~to require a highly raised~~ as to temperature
when the heat is intense.

How far this ingenious idea may be of
general application will require extended observations

State Facts

(a) The only exception which I know of, is a very little Calcareous Tufa at Chatham Is.ds —

Are not Corals sometimes equally absent in the Sandwich Is.ds? ——— Ho

From the Weather Journal kept on board the Beagle, I find the mean temperature of the water of the Sea in the Archipelago to be 68°. (67°.93). The number of observations in numbers very nearly equal, with some exceptions every day, at 8 A.M. noon, & 8 P.M; from the 16th of September when we first made to Chatham I. to the 20th of October when we finally left the Archipelago. — During this time the Beagle was either at anchor in different harbors, or moving from Island to Island. The lowest temperature observed was 58½, at the SW. extremity of Albemarle I: several times on the West side of the same Island. the temperature was 62° & 63°. —

Now I find that from the 19th of October to the 28th of November during which time we visited the Low Archipelago, anchored at two places at Tahiti, & sailed from it for 48 hours; the mean temperature of sea, ascertained by 44 Observations was 77.5; & the lowest any day being 76.5. The difference therefore in the mean Temp. of Galapagos & Tahiti was 9.5: but the difference of extreme lowest 18° & frequently 14°. — We know that the whole ocean near Tahiti abounds with Coral animals; & therefore we may presume the temperature of the Sea is there perfectly favourable to their growth; it may

(a)

it seems impossible
easily be believed that ~~an~~ the same inhabitant of the Tropics,
& especially a ~~marine~~ marine & similar one, would ~~bear~~ never flourish ~~survive so~~ not long
~~great a change as 18° degrees under a temperature~~
~~liable to vary to the amount of 18 degrees.~~
under two temperatures differing by so much as 18 degrees. — What is general mean Temp. of ocean beneath tropics? Vide. Humb. Voyage to Equinoct. Regions: 3^d Vol. Chap 39°. —

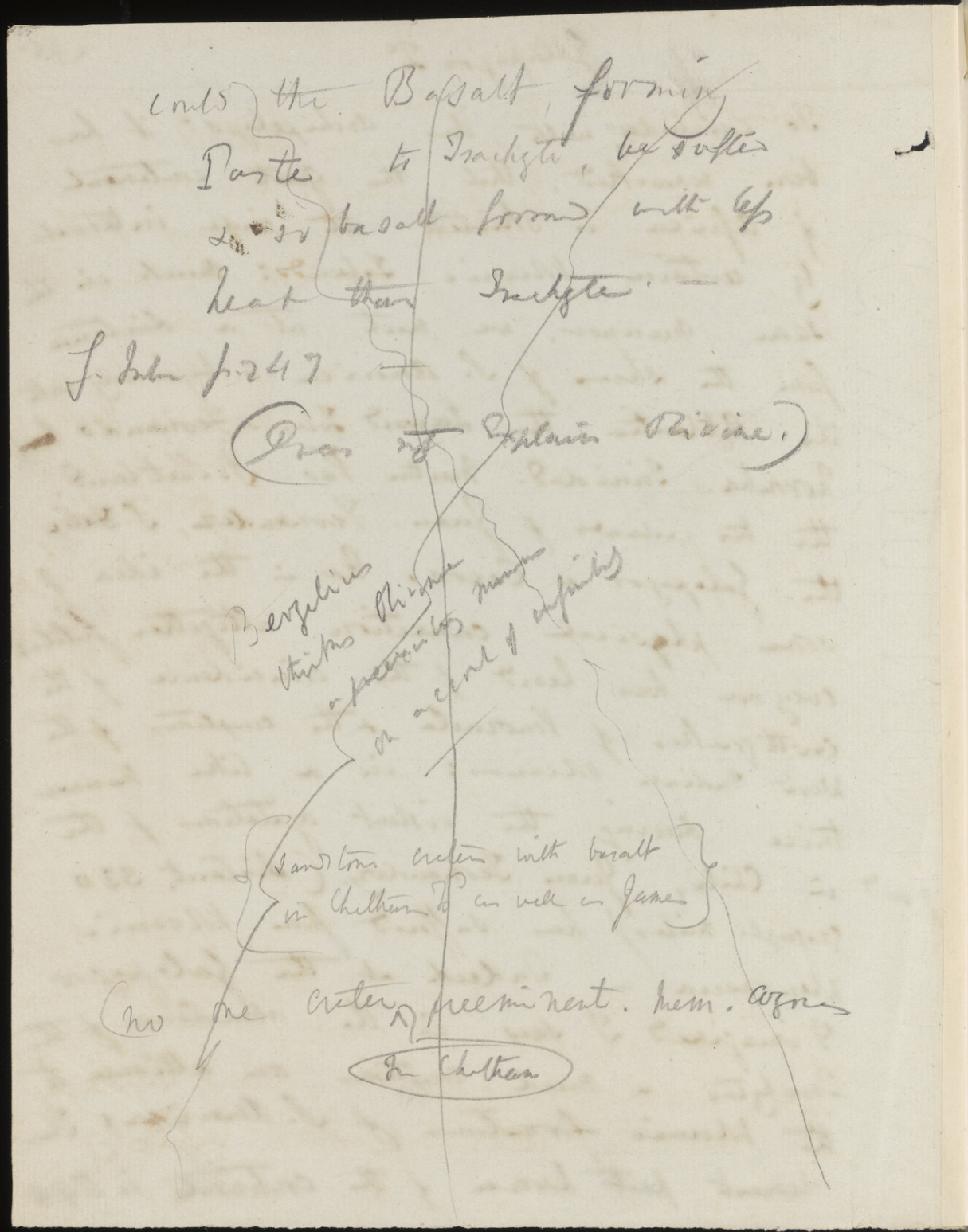
Vide latter part of VII Vol of Pers. Narrative

N.B. Humb. Frag. Asiatiq. Vol II. P. 580. Some account of coldness of deep waters of Pacific in Lat 20°: currents from which are probably thrown to the surface by the outer parts of the steep Volcanic Is^d of the Galapagos.

Mean temp of Equatorial ocean oscillates between 26°.8 and 28°
80 – 83 Fahr.
Vol VII. 369.
Pers Narr.

Galapagos &c. 794 45

To conclude with this archipelago: it has been remarked, that the great continent of Africa is skirted at wide intervals by certain Volcanic Islands: much in the same manner, we meet at a distance from the shores of S. America & beginning with the Atlantic, the Leward Isles. - Fernando de Noronha. Trinidad. Martin Vas. S. Shetland, the two islands of Juan Fernandez, S. Felix, the Galapagos & Cocos. Nor is the idea of some physical connection altogether futile: every one has heard of the coincidence of the earthquakes of Venezuela & the eruptions of the West Indian Volcanos: in a like manner twice during the violent agitations of the ground in Chili, Juan Fernandez (distant 330 geograph. miles) has suffered from Volcanic phenomena. - Indeed at the Galapagos (No Pumice) I imagined I saw in the abundance of the fragments & mud eruptions an alliance to the Volcanic formations of S. America. The nearest part known of the continent is 540



distant. In the direction of the principal Volcanic vents of the islands themselves a NW & SE line may be discovered. The principal line, pointed out by the linear shape & by four of the great mounds of Albemarle Is, includes also the distant shoals of Wenman & Culpepper. & Charles Is. — the direction however of this line is more truly NWbN. than NW. Narborough Is. & the SW mound on Albemarle Is. make a second short parallel line. A third, directed NW & SE. is formed by the Sol.ds of James. Indefatigable. Barrington, the shoal, & Hoods. A fourth, but not so regular a line, by Abingdon. Bindloes & Chathams Islands. — This direction will be seen to be parallel to the whole coast of S. America, & to be nearly in the same line, with that part of the shores of S. America, between C. Blanco & Arica. I have carefully pointed out, this construction of the Archipelago, by four lines, directed from SE to NW, because it will hereafter be seen, over how vast a space, the form of the land has been influenced by lines intersecting the Meridians at a uniform angle. —

Scrutiton Sandstone crater p. 189. Vol I — Geo

(Mackenzie Iceland Mecanic rocks)

(Abich on Leucite pre-existing in Jour. Phil. Geolog. Soc. VII. 1832–1835)

(See [illegible])

Mackenzie [illegible] lava flowing up Hill [illegible] [illegible] p. 390

It will be safe to state that the felspathic materials may [illegible] easily be sorted on a [illegible] basalt [illegible] base [illegible]

XX (also p. 3) craters broken down on one side [illegible]

At Auvergne. very little Pumice though Trachyte same at Galapagos (p. 24 Daubeny) This respect contrast to Ascension. Pumice in Ascension

Et [illegible] Auvergne

Von Buch states the structure [illegible] trachytic volcano [illegible]

N.B. at St. Helena  the [illegible] structure [illegible] be discussed

(Daubeny p. 386. good account of ejected fragments)

[Von Buch very strong about Trachyte being first ejected]

(Strong arguments of Galapagos deposits [illegible] with singular embedded [illegible]. R.N. 55)

XX

(Pisolitic balls p. 72. R.N.)

(Olivine pre-existing Mineral A p. 32)

(Order of Ejected lavas A p. 31)

795A

~~Welster. p. 185. account of 20 in front of V. Franca, setting to be add to Daubeny — Height 400 ft, of extreme rim — 300 yards diameter of rim~~

Pepenizo action at Sandwich 2d. & Barattee lavas
— Freycinets Voyage