

73. Bevil Street - London
Jan 25 - 1869

My dear Dawson

Thicknes of
Carboniferous

I have been corresponding
with Mr. Hull of the Government
Survey, on the alleged thickness
of the Carboniferous formation
from the Mountain Limestone
to the Upper coal measures
inclusive in North Lancashire
& Yorkshire. You will see a
Paper of his on this subject in
a number of the Quarterly
Journal of our Society lately
printed, - Vol 24 1868. pp. 320-325 - I asked him how
the strata could have been so
decided, also disposed of

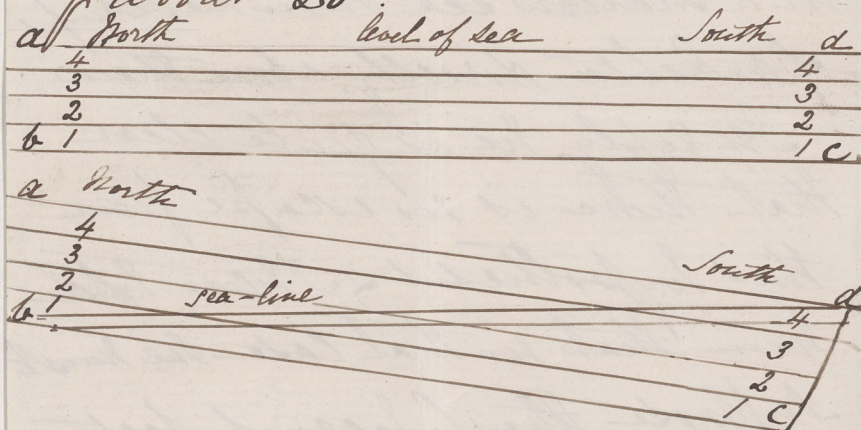
that instead of forming a
chain about as high as the
Alps we ~~see in a region only~~
~~3000 ft. high~~ ^{in spite of our seeing} ~~the~~
oldest strata as well as of the
newest Coal Measures above
^{we have only a region 3000 to 3500 ft. high}
the present-level of the sea.

I inquired whether he thought
the lowest beds, Mountain
Limestone & Millstone Grit
for example, might have been
tilted & denuded before the lower
Mid. & upper Coal Measures were
formed & whether by overlapping
or other means we could escape
from the conclusion that the
first formed shallow water strata
sank down two or three miles

perpendicularly in order to let the
newest beds of the series be formed
in a shallow sea or in the swamps
of a delta directly above them.

In reply he is quite clear
that there is no escape from
this hypothesis & I have told
him that in that case we must
suppose the S. Joggins section
to represent in mass which
was originally three miles
deep then raised at the northern
end three miles & at the southern
end one hundred feet & that
the whole mass a. b. d. has
been removed by denudation
so that we see the line of cliffs
a. b. d. at present existing with

The beds having an uniform
 & parallel dip at an angle
 of about 20°



I represented the length of the
 section as about 10 miles & I asked
 Mr. Hull if it would not be usual
 to find several folds or parallel
 anticlinals & synclinals in such
 a distance after such movements.
 This he has not yet answered,
 but Prof: Ramsay told me
 that in part of the S. Wales
 coal field you might go for 10

Miles with the beds dipping
one way & without any repe-
-titions owing to folds or faults -

I want you to tell me whether
first, the inclination of the strata
increases as you approach the
lower beds on the northern or
Normandie end of the basin -
Secondly whether you consider
the strata as part of a trough,
the other side of which would
dip the opposite way -

I find that Ramsay is
perfectly prepared for the removal
by denudation of 3 miles thickness
of strata. & Hull says he can
prove that there was a denu-
-dation of 10,000 ft. of Carboniferous

beds before the lower Permian
was deposited in Lancashire
which he believes to have taken
place as slowly as I do, which
gives to the Subaerial & sub-
marine agents of denudation
work enough to perform for an
indefinite period between the
Coal & Permian about which
we know little enough in
regard to the state of organic life.

I shall be glad if you
will indulge me in some of
your speculations on this head.
I do not remember that you
have any proofs of great faults
in your region, whereas dis-
placement of 6000 ft or upward,

are becoming more & more
evident to our Surveyors in the
Coal regions —

To refer again to the section
I may observe that each of the
Numbers 1. 2. 3. 4. may represent
a thickness of strata of nearly
4,000 ft each, so that the whole may
amount to a depth of about 3 miles
before No 4. consisting of productive
coal measures was finished. In
order that we may then have the
oldest beds appear at the surface
at the N. end, we must clear
away 2. 3. & 4. in the manner
before alluded to: a little only
of No 4. remaining at the S. end.
This reminds me to ask you

What is the average height
of the S. Joggins Cliffs. I think
I estimated 150 ft. If so I have
greatly exaggerated, perhaps
tenfold the cliff b. d. in the
diagram, but that is immaterial.

I have not attempted to
imagine the original junction
of the older rocks of Acadia
with the Carboniferous, but if the
denudation has been on the
scale assumed, what a vast
quantity of the older & funda-
mental rocks, upon & against
which the Carboniferous were
originally deposited, must also
have disappeared! It seems

to me hopeless to attempt to restore
the physical geography as it existed
at the time of the coal sediments.

We may however discover a minimum
of change or the least amount of
movement & denudation which
can be imagined in order to explain
the actual condition of things -

Since writing the above I have
found your Section from Minnie
to Apple River p 150. which answers
some of my queries & shows that
you consider the whole to be a
trough, as I conceive it, but that
being the case, shall we require a
great upheaval at the S. W. ex-
-tremity accompanied by denu-
-dation equal to that at the

N. E. end? -

I have just received Hull's
answer of which I send you a
copy. I think he has mistaken
the points of compass. I wish
you had put the length in miles
of your general section (p. 150) from
Minudie to Apple River. Although
one can supply it by the map. I
think it is between 36 & 40 miles?
If this be a basin, must we not
suppose that at the Chignecto ^{as}
well as at the
Minudie ends, there was a great
upheaval & between them or along
the present intermediate synclinal
line a region which remained
stationary - while the North and
South ends were rising &

being denuded? But I suppose
you conceive that a large part of
the southern side of the synclinal
if it ever corresponded to the
northern part of the basin has
been removed by denudation.

As the Cobequid Hills play
an important part in the
geological structure of that part
of Nova Scotia, ought they
not to have been distinctly
marked on the map where I
do not find the word Cobequid
except in reference to the Bay
of that name?

I hope you will give
me news of your family -
you our proceedings when

you write in the mean time
Lady Lyell study her remem-
brance & believe me
ever your old friend

Chas Lyell