[48r]

Ashley
Sun^{dy} 13th Sep^{r}
[1840] [added in pencil by later reader]

Dear M^{r} De Morgan

I am very much
obliged by your remarks &
additions. I believe I now
understand as much of the
points in question as I am
intended to understand at
present. I am much inclined
to agree with the paragraph
in page 48 ; for though
the conclusions must be
[48v] admitted to be most perfectly
correct & indisputable, logically
speaking, yet there is a
something intangible & a
little unsatisfactory too, about
the proposition. ____
I expect to gain a good
deal of new light, & to get
a good lift, in studying
from page 52 to 58 ; ____
though probably I shall be
a long time about this. I
could wish I went on
quicker. That is __ I wish
a human head, or my head
at all events, could take in
[49r] a great deal more & a great
deal more rapidly than is the
case ; __ and if I had made
my own head, I would
have proportioned it's [*sic*] wishes
& ambition a little more to
it's [*sic*] capacity. ____ When I sit
down to study, I generally
feel as if I could never
be tired ; _ as if I could

go on for ever. _ I say
to myself constantly, "Now today
I will get through so & so";
and it is very disappointing
to find oneself after an
hour or two quite wearied,
& having accomplished perhaps
[49v] about one twentieth part of
one's intentions, _ perhaps not
that. When I compare
the <u>very</u> little I <u>do</u>, with the
<u>very</u> much _ the infinite I
may say _ that there is to
<u>be done</u> ;_ I can only
hope that hereafter in some
future state, we shall be
cleverer than we are now. _

I am
afraid I do not understand
what you were kind enough
to write about the Curve;
and I think for this reason,
that I do not know what
[164r] the term <u>equation to a curve</u>
means. __ Probably with some
study, I should deduce that
meaning myself ; but having
plenty else to attend to of
more immediate consequence,
I do not like to give my
time to a mere digression
of this sort. _ I should
much like at some future
period, (when I have got
rid of the common Algebra
& Trigonometry which at
present detain me), to
attend particularly to this
subject. __ At present, you
[164v] will observe I have four
distinct things to [something crossed out]
carry on at the same

time ; _ the Algebra ; ____
Trigonometry ; __ Chapter 2nd of the
Differential Calculus ; _ & the
mere practice in Differentiation.

This last reminds me
that my bookseller has at
last & with much difficulty
got me Peacock's Book ; &
I hope it will be of
great use, for it's [*sic*] cost is
£2..12..6 ! __ It was
originally 30s. _ It is
[163r] coming here next week.

By the bye I have a
question to ask upon pages
203 & 204 of the Algebra.
In consequence of a reference
to page 203, in the 9th line
of the 25th page of the
Trigonometry, I was induced
to look & see what it
related to. Reading on
afterwards to the bottom of
the page, I found
"A f u n c t i o n a l e q u a t i o n is an
"equation which is necessarily
"true of a function or functions
"for every value of the letter
"which it contains. Thus if,
[163v] "$\varphi x = ax$, we have $\varphi(bx) =$
"$abx = b \times \varphi x$, or

"$\varphi(bx) = b\varphi x$"

"is always true when φx
"means ax." _
So far I think is clear ;
but then what follows, _
"Thus &c

"If $\varphi x = x^\alpha$		$\varphi\alpha \times \varphi y = \varphi(\alpha y)$
" $\varphi x = a^x$	...	$\varphi x \times \varphi y = \varphi(x+y)$
" $\varphi x = ax + b$	...	$\frac{\varphi x - \varphi y}{\varphi x - \varphi z} = \frac{x-y}{x-z}$
" $\varphi x = ax$		$\varphi x + \varphi y = \varphi(x+y)$

I cannot trace the connection. I suppose there is something I have not understood, in the explanation of the Functional Equation. _ I hope before very long to have something further to send you upon Chapter 2nd of the Calculus, either of success or of enquiry. __

Has Mrs De Morgan returned yet, & how is Mr Frend? _

With many thanks,

Yours very truly

A. A. Lovelace