

the radicle is coloured brown
whilst the hypocotyl & cotyledons
is left uncoloured. Now when a
'seedling *Megarrhiza* with the plum-
ule • just reaching the surface
was thus treated, the whole radicle
(+ hypocotyl) & the whole of the
tubular petioles (densely covered
with root hairs) became brown
whilst the plumule was quite
uncoloured. Therefore I think it
certain that the tubular petioles
act functionally like a root and
that the cotyledons are hypo-
gean. The sole use of this

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Jan 19.00

DOWN,
BECKENHAM, KENT.
RAILWAY STATION
ORPINGTON, S.E.R.

My dear Gray,

I have been greatly
interested with the *Megarrhiza*
seeds which you so kindly
sent me. You have been mis-
informed about their germin-
ation, for I think you cannot
have watched the whole process.
Some were placed by me on, and
others half an inch beneath the
surface, and others deeper,

but none of the cotyledons were
lifted up. One seed on the surface
was a little tilted by the root
not penetrating the ground, but
this often occurs with all kinds
of seeds. The petioles of my
specimens were not stiff enough
to bear the weight of the seed.
What takes place is that the
radicle bends down & penetrates
the ground, but grows only to
a length of about half an

inch or less (length rather doubt-
ful as I did not wish to kill
specimens by making sections).
When of this length its growth is
arrested, and the lower ends of the
tubular petioles grow quickly &
penetrate the ground just like
a root to a depth of nearly $2\frac{1}{2}$
inches; then their growth ceases,
and now the radicle takes up
the game & grows ^{very} quickly. In
every case the base of the radicle
lay ~~two~~ $2\frac{1}{2}$ inches beneath the
surface. You probably know that
if ordinary seedlings are placed
in solution of permanganate of ^{potassium} $KMnO_4$

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Gray 126

DOWN,
BECKENHAM, KENT.
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wonderful manner of growth
which occurs to me is to hide
the enlarged root, at least at
first, beneath $2\frac{1}{2}$ inches of soil
as a protection against enemies.
When my plants are two or three
weeks old I will cut a slice
from the root, and taste it &
test it for starch. Now can you
tell me whether the plant is
an annual or perennial? When
the root has become huge does
it come to the surface, and is

DOWN
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DORINGDON 2 1/2

It then hard, ^{and is it} or then bitter?

I wonder whether it is attacked
by beasts, birds, insects or slugs
in California?

It has been a great grief to
me that not one of the seeds

of *Ipomoea leptophylla* has
germinated: my gardener opened
some & found them rotten. I hope
I haven't wearied you much

Ever, my dear Gray,
Yours sincerely

Charles Darwin



Darwin, Charles. 1880. "Darwin, Charles Jan. 19, 1880." *Charles Darwin letters to Asa Gray*

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