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Rock Products

AGRICULTURAL LIMESTONE IS
COMING INTO ITS OWN

Low a Limestone Producer and
Promoter Convinced Himself of
the Efficacy of Agricultural
Ground Limestone

By W. S. Halladay

Manager of Soils Bureau, Wisconsin
Limestone Co., Waukesha, Wis.
Reprint from Rock Products Journal

In the course of a year's work
you meet with all kinds of argument
relative to agricultural limestone,
and before one has followed the
work for long, if you are really in-
terested in the progress of better
agriculture, as well as the manufac-
ture of agricultural limestone, you
are forced to recognize the following
important problems:

First: What functions does lime-
stone perform in the soil? Second:
What must constitute a perfect ag-
ricultural limestone? Third: What
condition must be proved?

You first of all realize that this
condition makes it necessary that
you be willing to put your best ef-
fort into the work, and spend the
time necessary to work out each
point, and prove by actual test the
value of different materials, and the
result of the same in actual work.
It was some years before I realized
the conditions, decided to stay with
the work, and stand or fall by
proved tests, but I am pleased to say
that in 1920 facts have been proved
not only to my satisfaction, but by
my own efforts, but the results were
recognized and acknowledged by soil
experts, so we are still standing.

I will try and review the work in
as brief a way as possible, and also
give you some reasons why it was
necessary for the facts to be proved
that agricultural limestone might
receive justice in the reclaiming of
depleted soils.

All companies selling fertilizers
as well as many state agricultural
colleges, refused to accept agricul-
tural limestone in the list of fertil-
izers, claiming it was not a fertil-
izer but a "soil neutralizer," yet
Prof. Chas. E. Thorne of the Ohio
Agricultural College has said, "with-
out lime there can be no life, either
animal or plant." The late Dr.
Cyril G. Hopkins, Chief of the Agri-
cultural College of Illinois, said
"the only fertilizers not naturally
produced on the farm itself are
ground limestone and ground rock
phosphate."

Dr. H. J. Wheeler, formerly with
the Rhode Island Agricultural Col-
lege and now with the Agricultural
Service Bureau of Boston, said, "lim-
ing is the most economical basic
treatment of the soil known, in fact
no other basic treatment is either
so economical or lasting, or is it
followed by such general good re-
sults as liming." Prof. Chas. E.
Thorne of Ohio again said, "every
other fertilizer material, including
farm manure, depends on the lime
supply."

And yet in the fact of the above
statements from the three greatest
authorities on soil building and fer-
tilizers we have ever had, men to
whom the farmers were looking for
instruction, would claim limestone
could not be considered a fertilizer.

Webster defines a fertilizer: Any
material used as a manure for land.
Manure is defined: Any fertiliz-
ing substance used for enriching the
soil.

To fertilize is defined: To make
fertile, render more fruitful.

To prove then that ground lime-
stone was actually a fertilizer it
was necessary to prove that it would
make soil more fruitful.

With these facts before me I de-
cided to personally make the test.

My Own Test

I secured a tract of land that had
received no soil treatment of any
kind for twenty-five years, and had
become depleted almost to the point
of non-production.

In the fall of 1919 I limed the
soil with a heavy application of
ground limestone and let it lay over
winter on fall plowing. In the
spring of 1920 I personally prepared
the seed beds and planted on the
17th, 18th and 19th day of May.

On October 21st I made a display
of a variety of the crops in my gar-
age, which I photographed, and
which was claimed by our county
agricultural agent to be the finest
display and largest variety he had
ever seen in Waukesha County from
one farm.

It has taken time to work out this
plan of proof, but I have positively
proved that Webster, Hopkins
Wheeler, and Thorne are correct
and that ground limestone is just
as much a fertilizer, in the fact
that it will singly and alone render
land more fruitful than any other
substance used as a fertilizer, and is
a fertilizer beyond any question
whatever.

A "Perfect" Agricultural Limestone
During the time of experimental
work to prove limestone a fertilizer
many interesting facts have also
been proved relative to what con-
stitutes a "perfect" agricultural
limestone, which I believe will be
interesting to those following this
line of work.

At the beginning I felt certain
of one thing; that to be of value a
stone must of necessity be soft and
soluble. This was contradicted by
many soil men of experience, who

claimed that a soft material was un-
necessary, so long as the material
was finely ground.

It was very soon demonstrated
that a hard rock finely ground did
not give the results attained by a
soft stone more coarsely ground.

After this was proved, other tests
were made and the vital points
studied to ascertain if possible what
grinding and class of material was
best for the most economy in use.

It was discovered that with a
rainfall of 29 to 30 in. per annum,
2 1/2 lbs. of calcium was leached out
of the soil for every cubic foot of
water passing through it and that
the finer the material was ground
the more subject to leaching it was.

This proved that in a section of
plentiful rainfall the leaching was a
heavier drain on calcium in the soil
than was the cropping.

Coarse grades of limestone were
tried out, only to find that the soft
soluble stone would give results
where the hard rock of the same
grinding would not produce for
three years, thus proving the soft
stone was preferable and more satis-
factory, being more economical to
use and giving desired results.

On further investigation it was
found that experiments at state ag-
ricultural stations making tests for
the past forty years had decided on
a material consisting of a combina-
tion of powdered material mixed
with a material a little coarser, and
on account of this being found most
economical in use and most efficient
for results, laws have been made in
some states regulating the grading
accordingly.

With these facts at hand, I was
forced to realize that in our state,
where agricultural limestone is be-
ing offered, in nearly every case
the material was a waste material
or a by-product; no special agricul-
tural limestone was being offered
and that to give the farmers what
they really expected and were en-
titled to a strictly agricultural lime-
stone plant was necessary.

I therefore secured a quarry, rec-
ommended by W. W. Weir, recently
professor of the soils department of
the University of Wisconsin, as the
best agricultural limestone in the
state and put into existence the
Wisconsin Limestone Co., which at
present is constructing a strictly
agricultural limestone plant that
will be run exclusively to produce a
material which my tests have proved
to be the most economical to use
and one that will guarantee the re-
sults expected.

The agricultural limestone indus-
try is in its infancy. It must come
into its own, for without it agricul-
tural production will continue to be
less and less each year.

We should be positive about one
thing in the manufacture of agri-
cultural limestone: that the farmer
receives that which is best and most
economical for his use, for one fail-
ure in a district kills the use, of
the material for a long period of
time and is not only a loss to the
manufacturer, but to the farmers
as well.

I will be pleased if the proved re-
sults assist anyone in the work and
encourage the manufacturer who
has the right kind of material to
put his product in the correct com-
bination for a perfect result. I will
be pleased to assist anyone by fur-
ther information on the tests I have
made.

Our soils bureau is maintained
for the purpose of giving free in-
structions and information relative
to soil building and general farm-
ing.

**Rare Minerals, Metallurgy, Chemistry
ROCK PHOSPHATE**

TORRANCE, March 25.—Question:
Reply to yours to Walker,
our superintendent, Torrance Lime
and Fertilizer Company. Herewith
larger samples; shark teeth, tusks,
bones, etc., found in same deposit.
Answer: Correspondents will read
with pleasure that the greatly-de-
sired rock phosphate will, in all
probability, be an added asset to the
mineral wealth of California.

Today, after running down many
reports and in analyzing many min-
erals from the mining boys in the
hills, we find it is probable that
California will be in a position to
mine phosphate rock in sufficient
quantity to meet all requirements.

The samples sent to us from Tor-
rance are rock phosphate running
high in phosphoric acid. They are
of blackish-brown color and from
their worthless-looking appearance,
at sight, have probably been un-
noticed for 10, these many years.

**NEWER ASPECTS OF SOME
NUTRITIONAL DISORDERS**

(By Alfred F. Hess, M. D.)

"It has been found in Victoria,
for example, that cattle raised on
certain pastures develop paralysis
and other infirmities which can be
cured by fertilization of the soil. In
the United States in some areas it is
impossible to maintain cattle in good
condition until the forage is im-
proved by mineral or animal fertil-
izers, which illustrates that a defi-
ciency in plant tissues leads to nu-
tritional disorders in animals, and
this also applies to men. Recently
Hart, Steenbock and Humphrey
have confirmed these observations
by careful experiments which showed
how the mere addition of calcium
to the fodder of cows prevented the
birth of premature, weak or dead
calves. Indeed, the extensive in-
vestigations of Forbes showing that
cows producing large amounts of
milk, and fed common winter rations,
undergo constant losses of calcium,
magnesium and phosphorus from
their skeletons, suggest that large
numbers of milch cows are suffer-
ing from a deficiency disease. These
chemical analyses recall Hanau's
report of almost thirty years ago,
to the effect that the bones of
pregnant women, who had enjoyed
apparent health, frequently were the
site of lesions resembling osteomal-
acia, an interesting observation that
might be substantiated during life
by means of recent genologic exam-
inations."

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