

Higher Education
less prominent² and manifest-
ly there is something in it—
in point of fact a great deal in it.
Modern Chemistry for instance
has subdued the elements of
matter and utilized them in
the arts of life. The handicrafts
by which the millions are clothed
and sheltered and fed are
greatly advanced and honored.
Telegraph wires do connect all
the larger towns and cities on
the civilized globe and so far

as the exchange³ of important
events is concerned do blend
them into one. Railroads do span
and respan all the enlightened
countries on the round earth
just as they did not forty years
ago. Steam and electricity are
the great modern civilizers. The
shriek of the whistle does startle
the wild bison of the plains &c. &c.
But meantime there are some
things of high human interest,
of vital and universal interest

indeed that ⁴have not progressed
or at best have progressed
but slowly. One of these for exam-
ple is Modern literature. Though
incomparably vaster in quantity
it is scarcely equal in quantity
to that of Olden time. Homer
stands head and shoulders
above the whole brood of living
poets. In the whole brood of liv-
ing orators not one has reached
the full stature of Demosthenes,
and every living dramatist bows

reverently to ⁵ the greater dramatist
of three hundred years ago.

But that which refuses most ob-
stinately to submit to modern
reform, that which declines to
advance when all things around
it are advancing, that which
clings most tenaciously to its
time honored dogmas and
worships most devoutly its
moss covered idols is higher
education. For though as the
centuries advanced civilization

has put on new forms and consequently developed new wants and new pursuits, the venerable system of Scholastic culture has held on its course disdaining to read the signs of the times and submitting to no substantial changes in matter or method.

Nine tenths of all the well known institutions of learning in the world are organized on the plan of conferring a culture which does not in many an

instance fit the student may in
multitudes of cases unfit him for
the work that lies before him.

Michigan University, Yale and
Cambridge of our own country,
Oxford, Cambridge and Edin-
borough - all the far famed
Universities of Europe, furnish
courses of study which are weighted
down with languages spoken two
thousand years ago and having
no immediate relation to the

intense activities of the present.

Even the seminaries and acad-
emies whose name is legion dis-
perse useful Knowledge in Ho-
meopathic doses while they dwell
on the elements of Latin and Greek
as though they were the great
panaceas for all intellectual
ills. ^{Education} The consequence is that
^{preponderates} throughout the world the educa-
tion gained in our higher insti-
tutions is to speak ^{largely} out of

joint-⁹ with the things with which
human life brings us into daily
inevitable contact, and thou-
sands of young men and young
women too instead of being ed-
ucated for their life work are
educated away from it; instead
of deriving from the academic
course a special fitness for
life's duties derive therefrom
a special unfitness and dis-
~~like~~ taste for them. A mattering

of French. Music Rhetoric and the
 like gleaned by the School girl
 at the fashionable Seminary
 gives no genuine training for
 the solemn responsibilities of
 wifehood and Motherhood which
 in the order of nature lie before
 her. ^{not receive} On the contrary it may safely
 be affirmed that the more she
 knows of the former the less com-
 petent she becomes for the latter.
 I would by no means assert that

literary culture is incompatible
 with skill in housekeeping and
 home management. What I do
 say is that the knowledge which
 underlies the employments that
 nature brings should be mastered
 first and then the ornaments
 and graces of culture may be
 afterwards added.

Nor is the aspect of
 higher education ^{generally} one whit
 better when scrutinized as to

its effect on the other sex. The
farmer who, gathering the means
from a life of toil sends his son
to a college in which the old courses
prevail can never expect him
to bring back with his diploma
any practical knowledge for
the improvement of the paternal
acres. Grass roots and ruda-
bergas thrive not in the same
soil. The farmer boy returns
no more but there appears

instead before¹³ the astonished
father an exquisite young
gentleman with ^{an astonishing} a stove pipe
hat, a Meershaum, gloved hands
and a dainty Mustache, a
distaste for labor and a deep
disgust for the odor of the Stables.
His talk is not now of beavers of sheep
and crops and horses but of pony-
ing and cramming of dodging
the Prof. and of hazing the fresh-
men.

No son of the Mechanic

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graduates from the time honored
Classics to build better houses
than his father. No son of the
Merchant or of the banker comes
home to vitalize the business
there by a wider business grasp—
none of these— His education,
the more thorough it is, yet the
more disqualifies him for the
skillful management of the
farm the workshop or the Count-
ing room and the more surely
drives him into one of the over-

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Crowded professions where he
may possibly become ^{perhaps} a
fourth rate lawyer whose bus-
~~ness~~ grows better as the world
grows worse or a poor preacher
perpetually in search of a va-
cant-pulpit.

Now this state of
things - this educating men
^{and forever} continually away ~~to~~ from
the great industries where the
scientific workers are few into
the professions where the learned

workers are ¹⁶ many is to say
the least a sorry business
to society in general and to

the boys in particular? It is all

So far as it ~~thruws~~ ^{throws} the great interests
wrong and being all wrong it has
of ~~life~~ ^{of life} ~~out of~~ ^{out of} balance

Of late set a goodly number of
sensible practical people to
thinking and to asking the ques-

ion "Why should these things be so?"

^{there has been much shuffling of the}
Whereupon the Dons and the

Lavens and the D. Ds. and the
L. L. Ds. have shrugged their
shoulders and thrust their tongues

into their cheeks, and pook pooked
and pshaw pshawed and
in short done everything but meet
the question with a square ar-
gument that should set it forever
at rest. Ridicule is easy, refuta-
tion quite another thing. In all
my reading I have failed to find
an able argument against the
practicability of an education
in which every item of knowledge
gained should be available in
the business of life. And this

What the man must practice? ²⁰ ²⁶ "c"

And the answers to these questions have taken the form of solid walls and new institutions with new modes of government, new educational maxims and new courses of study wherein

the dead languages die entirely out and science greatly predominates. ^{the lost bulwark of literature and the modern} In that ^{those} states where ^{science is fully restored}

the virgin soil is deepest, the breezes of heaven freshest and heads and hearts are freest

sinks to elevate the professions—
the new education strives to help
the industries. The old educa-

tion withdraws learning to ven-
where she is surrounded by the commoner and sanctities of other
erable halls where cribbed, cabined
of him

and confined. She may be wor-
shipped by chosen votaries and
not soiled by contact with com-
mon humanity. ~~She~~ The new ed-

ucation ~~the~~ emerges from Mus-
mystic halls

by Mythology, puts on the white
drapery of science, comes forth
into the open air, and the broad

Sunlight reveals²³ to her loving fan²⁹
pils the secrets of nature,
Teaches how lightning is utilized,
how ores are mined and reduced,
how rivers are bridged and
mountains tunneled, how
plants grow, how marshes are
drained & worn out soils for-
tified, teaches how fruits and
cereals and domestic animals
may be improved, how every
article of food and fabric can
be produced with the least

possible waste of muscle and ²⁴ 30
material - in short takes
the laborer by the hand - the
laborer ^{one} crippled by ignorance,
and lifts him up with the
loving injunction "I say unto
thee arise!" Such is the purpose
of the new education, philan-
thropic, practical, helpful to
all. Is not this purpose a good
one? ~~(stop here)~~

But there is another
question respecting the New edu-

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sation equally vital in deter-
mining its value - What is
its effect on Character - while
it gives to Students a special
preparation for their allotted
work does it make Men - Men
intellectually broad shouldered
and deep chested - Men quick
in expedients, ready in emer-
gencies, trained to affairs, de-
serving of public trusts - Men
of weight and influence and
foresight - And above all of good

Sound Common Sense - ³² If the
men ~~that~~ ^{that} are not for sale.
New Education though it

Makes Millions of experts fail
in a matter so important as
this the failure is surely a
fatal one. But it does not fail.

Its great underlying law is
that youth shall study what
maturity shall practice and
this maxim covers not merely
the handicrafts but the whole
area of human activities, in-
tellectual, Moral & Material.

If the youth²⁷ has decided²³ to be-
come an architect for in-
stance does he need to be told
that he will not thereby escape
being a citizen as well? And
just as a knowledge of the var-
ious architectural orders and
styles, a mastery of the principles
of descriptive geometry and
practice in architectural draft-
ing is essential to the success-
ful architect, so the mastery
of Moral Philosophy, of Social

Science, of ²⁸ Political Economy ⁸⁴
and Constitutional Law
are essential to becoming act-
ively and passively a Model
citizen. And there are the
studies which when fully grasp-
ed and applied in practice
give a man weight and influ-
ence and foresight - studies
which round him out into the
proportion and symmetry of
a genuine Manhood. How can
one better learn to be ready in

emergencies²⁹ than by studying³⁵
the principles from which
emergencies take their rise, and
how can one be trained to af-
fairs better than by a mastery
of the laws that underlie affairs?
^{It is} ^{conferring} furnished scholarship in special directions
The old education, seems never
to have accepted these logical
conclusions. It prescribes stud-
ies for the discipline they bring
and affirms that their use is
an incidental and ^{a comparatively} unimpor-
tant result. The new education

prescribes ³⁰ studies for their act-
ual uses and declares that
discipline is an incidental but
sure result. The old asserts that
culture is gained from the par-
ticular matter studied. The
new replies that culture comes
^{largely} not from the matter studied
but from the manner of study-
ing it and that earnestness of
effort-only will beget intellectual
growth. The old education, to
illustrate things mental by

things material would prepare³¹
the tyro for swimming³⁷
by giving him a muscular drill
out of water so perfect and well
balanced that if by accident he
fell into water it might be expected
he would swim anyhow. The
new education puts the tyro at
once into water, gives him all
needed instruction and help
declaring that the best prepara-
tion for the art of swimming
is found in ^{the act of} swimming itself and

that the exercise of the art³² of fre-
quently and strenuously
repeated imparts Muscular vig-
or also. Man in his present state
is destined like the verb of Old
Murray to be, to do and to
suffer. The old system educates
him to be and infers that the
power to do and to suffer will
follow. The ~~new~~ education system
educates him to do and to
suffer and infers that the being
will follow and he who studies

God's plan of ³³ discipline ³⁹ knows
right well that it is the doing
and suffering in this world
that perfects character and rounds
out the man. ^{stop here molly} Thus these two
systems are pursuing their ob-
jects on precisely opposite the-
ories and I think I may safely
leave you to judge not only
which is the more practical
and useful but which it is
that confers the more valuable
discipline.

~~But~~ While the ³⁴ new education

makes men by teaching in
just measure the things that
enter into their future activities.
While it extends the helping hand
to the miner, the mechanic, the
engineer, the housekeeper and
to the whole host of toilers, it is
more in keeping with the pur-
pose of the evening to show pre-
cisely what help it offers to the
farmer or more properly to the
youth intending to be farmers.

~~Perhaps~~ we shall ^{3^d} clear the way a lit-

tle and give the subject such shape that it may be more easily grasped, if we premise what the New Education as represented in our Agricultural College cannot and need not do. ~~First~~ it cannot do the work committed by the State to the primary Schools. ~~In-~~struction in the common branches is already amply provided for by the Law of the State which de-clares that these institutions of the

people shall be free to all. ³⁶ ~~The~~

Agricultural College cannot teach the branches assigned to the district schools without losing sight of its peculiar purpose and misapplying and wasting the noble fund which has arisen from the national bounty. ~~Such~~ a policy would manifestly violate the Congressional law which gave birth to these institutions and which declares that they shall teach such branches of learning as are related

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specially to Agriculture and the
mechanic arts in order to
promote the liberal and practical
education of the industrial
classes in the several pursuits and
professions of life. For these evident
reasons we refuse admission and
not without offence sometimes to
scores of boys and girls whose knowl-
edge is defective in geography
grammar or arithmetic.

Then again the Ag-
ricultural College cannot and

should not be³⁸ expected to give
instruction in the rudiments
of farm work. It does indeed
require that every student who
engages in daily Manual Labor
shall do his allotted work thor-
oughly and well but to teach
young boys how to handle the
spade the hoe and the axe, to
drill them in the art of milking
or cleaning a horse or managing
a team would require a super-
vising force which the College Com.

not supply - and in fact such
rudimentary instruction is
little needed. ~~Thousands~~ ^{Thousands} of farms
throughout the State are admirable
schools for elementary practice in
the ordinary routine of farm
work and the consequence is that
students bring to the College an
adequate experience in this regard.
Daily Manual labor in the
Agricultural College, though
not given as a regular lesson in
the primary processes of the farm,

is nevertheless ⁴⁰ a most important
help to industrial education.

~~It prevents~~ It prevents the student when
absorbed in study from drifting
away from the salutary habits
formed usually at home. It
keeps his sympathy with the
pursuits of the farm active
and strong. ~~It pays~~ It pays a portion
of the year's expenses which
might otherwise prove a burden
too heavy for many an Iowa
boy to bear. By furnishing daily

healthful exercise it serves as a
shield against the legion
of diseases that wait on sedentary
life. ~~It is~~ It is a cure for all the
peculiar College restlessness
which is so prolific of mischief -
mischief for which the ^{ancient} ~~old~~ system
of College government has found
no remedy. ~~Orchards~~ and Melon
patches and hen roosts are gen-
erally safe in the neighborhood
of an institution that requires
and sustains daily manual

Labor. ~~work~~⁴² is the most health-
ful of sedatives. ~~It~~^{It} renders
the nights sleep uniform and so
is an antidote to ~~night~~ revelings
and night wanderings. ~~Its~~^{Its} whole
scope and tendency is towards
a wholesome College Morality.
~~He~~^{He} could by no means do with-
out it, and yet the moral results
gained from combining labor
with study are only incidental.
~~The~~^{The} real purpose for which it was
introduced into the College was

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to make it serve as an auxiliary
in the business of industrial
education. The new education
attempting far more than the
old is far more exacting. ~~It de-~~
mands not only that the pupil
should learn how a thing is
done but that he should see
it done, not only that he should
see it done but that he should
do it himself. ^{to} First Master the
principle then to witness its
application and then to apply it-

personally - ⁴⁴ Here Science and
practice are learned at
once and so strengthen each
other, are, in fact, so clenched
and dovetailed together in the
memory as to make forgetting
impossible. The judgment, the eye,
and the hand receive a simulta-
neous training - a training
which precisely corresponds to the
demands that are made upon
them in practical life. What
more exhaustive scheme for giving

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An available culture could possibly
be devised? Such is the pur-

pose of manual labor as one of
the educating forces. In apply-

ing it to the accomplishment

of this purpose, we have many

difficulties. No precedents shed

their light upon our pathway.

We are groping somewhat in

the darkness of experiment.

With all the usual accompani-

ments of an untried scheme -

Doubts, Mistakes in lesser details

here and there a failure, pro-
gressing on the whole, fru-
ition as yet partial, but we know
the principle to be genuine and
that with faith, patience and
untiring watchfulness, success
full order will rise at last. And
the Agricultural College in this
matter as in all others means
business.

This much for the Mis-
sion of Manual Labor both as a
moral force and as an aid to

practical studies. We have now cleared
the way for asking and
answering the question "What
positive helps does the new educa-
tion give the farmer student in
preparing for the management
of the farm?" ~~Now~~ the farm is
the theatre of many operations
some of which are not very closely
related. Sheep husbandry and
fruit-raising for example can
be distinguished from each
other without any painful stretch

of thought. ⁴⁸ The fact is the term
Agriculture once signifying
simply the tilling of the field,
embraces a variety of branches
each of which is based on a dis-
tinct Science more or less devel-
oped or on experiments whose
complete results are not yet reach-
ed. The whole question of pre-
paring the soil for the raising
of crops is still largely a matter
of experiment in which valuable
knowledge is reached without

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establishing full, complete, and
reliable rules. On the other
hand the improvement of the
domestic animals clearly de-
pends on the application of An-
atomy and physiology and
the laws of inheritance to their
breeding and treatment. Now
the man who has experience
and practice without science
may do well but since science
is simply a summing up of ^{all} the
valuable facts in the case, he

Who bases his ⁵⁰ practice and experience upon it; will do much better. All our great Stock breeders are men of science and it is because of this that they are such keen and careful observers. But leaving this view of our subject which if carried too far might prove a soporific to my audience, let me say, in the first place, that the new education will teach the young farmer how to fight

his enemies. ⁵⁷ ~~Notorious~~ Noxious insects
and animals, Noxious
weeds, drought, untimely
frosts, hail and wind, the
water of marshes, the diseases
of animals and plants, these
are the foes with which he must
have a perpetual ~~struggle~~ ^{strife} and
by which, if he be not wise and
watchful, he will be perpetually
worsted. There are some of these
indeed against which no knowl-
edge of science in its present con-

dition will ⁵⁻² wholly avail. Yet

the man who has mastered
all known facts concerning
them, their causes, duration
and cure so far as discovered,
has beyond question an immense
advantage in waging war
against them. All over the
land there is a deplorable ig-
norance of the commonest
pests that infect the farm and
consume the earnings of the
farmers' toil. How many Agri-

culturists have any acquaintance
with the habits and homes
and breeding of the common
rat that can be made available
in his extermination? ~~Against~~
How many do scores of gopher
hills annually rise up in judg-
ment? ~~How~~ many orchards are
annually given over to the worms
when a moderate knowledge of
entomology would save both
the tree and the crop, ~~The~~ year-
ly waste from this source alone

are naturally ⁵⁻⁵ destructive to these
should be carefully multiplied.

With every returning summer
comes the resurrection of the swarms

of borers, Curculios, weevils worms
~~Grasshoppers~~
and the like, which combine in

countless hosts to rob the farmer
of the ^{products of his labor} ~~earnings~~ of his toil. Par-

ticular families of these have
~~of late~~ generated with such a

growing rapidity ~~in the last~~
~~few years~~

as to beget a well grounded
fear that their numbers will re-

led to the utter annihilation of
the crops on which they feed.
In some quarters this fear ^{has long since been} ~~is~~
~~readly~~ realized. The Locust, once
valued for its enduring wood
and grateful shade, has yield-
ed to millions of perforations
which have ~~well nigh~~ reduced
its limbs and trunk to dust.
The plum tree which once offered
its sure fruits, round, ripe,
and melting, now casts them
annually to the ground blighted

and worth¹⁸less. In all manner
of vegetable delicacies the
worm is demanding to be served
first. The time may come when
no man can taste an apple whose
skin unflecked and, ^{un}stung
shall forbid the apprehension
that the first incision of the teeth
shall reveal a slimy occupant.
~~The time has already come when~~
~~to indulge in the luxury of green~~
~~peas is to devour a host of~~
~~unsavory grubs which are the~~

progeny of a ⁵⁸ prolific insect.
But most terrible of all ~~is~~ and verily ~~is~~
These various destroyers,
as yet from science and skill is the
threatening such wide spread
scourge that hides the sun and harkens
coils demand the wisest and
the sky and where it alights turn
most vigorous measures for their
the beauty and the reason of the
extermination. Such measures
fields into the ~~barrenness~~ ^{barrenness} of the
can be founded only on an ac-
cise knowledge of their form,
habits, metamorphoses, and
modes of propagation. ~~Now the~~
~~the~~ science of entomology ^{reveals} laid
~~down in the Agricultural~~
~~course reveals to the student~~

all the forms and phases and
wonders of insect life. ~~It~~ ~~It~~ ~~It~~

Shows all the mysteries of reproduction - at what season and where the egg is deposited, how long it remains an egg, when the grub comes forth, its structure, food, habits, whereabouts, duration - how with millions of fellow grubs it works its mischief to the crop, then coils itself up and lays itself away to rest a while in the chrysalis state from

21 which after ⁶⁰all these vicissitudes
it emerges at last a perfect
insect, lives its brief period, lays
innumerable eggs and is gath-
ered to its father's. Having such
intimate acquaintance with
the times, seasons, changes, and
modes of growth of insects that
are harmful to vegetation, a
man may go about their exter-
mination intelligently but
without it - he can only make in
some instances at least such

²² Blind endeavors as will lead
to blundering failure. Stop here

The case is not very
different when we consider the
weeds that infect the soil and
absorb the nutrition needed
for the useful plant. The farmer
may indeed be able by the
experience and observation
gained ^{from} ~~by~~ practice largely
to rid his fields of these un-
welcome intruders but he will ac-
complish this with greater certainty

and often with ⁶² less expense of time
and effort if he knows specif-
ically and accurately their na-
ture and ways. In so far as his
experience and observation take
in ^{to} account the habit of the par-
ticular weed, its time of germi-
nating and seeding and
method of sowing ^{to} they will in
fact be scientific. A farmer
whose experience is so grounded
will attack his enemies in the
period of their weakness so that

when they die ⁶³ under his vigorous

assaults they shall die a
death from which there is no
resurrection. Such a farmer
will not delay to root out some
solitary thistle until it has given
its countless seeds to the breeze.

He will not while assiduously
cultivating the rest of his farm
leave some neglected corner to
mature a baleful crop and
sow its seeds broadcast on the
winds. He will not while keep-

ing his cornfield ⁶⁴carefully clean
leave a thick hedge row of
weeds on its border to ripen &
stock it thoroughly for the
next season. This study of plant-
life as illustrated in the common
weeds is not only highly useful but
it is full of interest also. Evidently
they are Nature's favorites and she
has devised all sorts of expedients for
their preservation. For one she has giv-
en seeds which are equipped with
wings so that they may fly on the

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minds to sunny spots where they
spring up and bring forth fruit.

Some fifty thousand and some a
hundred thousand fold. Another

she has taught to break itself off

when mature commit itself to the
prairie breezes and get itself tum-

bled all over the country scattering
its seed as it goes. Another still, the

purslane, spreads on the ground

and sends numerous tiny root-

lets downward all along its flesh-

y stems so that it needs to be hung

up in the sun⁶⁶ before it will consent
to die, so fleshy and juicy
and full of vitality is it, that if
it be torn from the ground any
time after flowering, it will put
off dissolution until it has ripen-
ed and sown its innumerable
seeds. All such facts, each sug-
gestive of its own prevention, are
made familiar by the study of
Botany and Vegetable Physiology
which are prominent branches in
the Agricultural Course. A student

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may indeed be a botanist with-
out being much of a farmer
but if he is to be a farmer if he
is to make our laught or noxious
weeds and troublesome shrubs,
a mastery of these will surely en-
able him to fight them with
deadlier weapons and find a sur-
er victory. Class here

The limits of an evening
lecture compel me to pass by the
subject of droughts, of heavy
rains and untimely frosts. Upon

the very important subject of
marshes, I will pause only
long enough to remark that
many thousands of acres of our
richest-Iowa lands are still
water soaked and useless - that
they can be reclaimed only by
thorough drainage, and that
the principles of scientific drain-
age can be learned by the study
of farm engineering, another
branch comprised in our list.
Large sums have been wasted

in this country by attempts to
turn Marsh into Upland
which have been blundering
and futile because unscientific.

But no one depart-
ment on the farm is to my mind
so full of promise to the farmers of
Iowa as the Department of domestic
animals. Her greater distance
from the centres of commerce, and
the consequent heavier rates of
freight, will render it unprofitable
for Iowa to compete with nearer

states in the shipment of corn and
wheat, while their diminished
bulk in proportion to value and
the comparatively smaller expense
of feeding will make it steadily
profitable to compete in the ship-
ment of cattle and swine, distances
from market, depth of soil, and
the resulting superabundant-
corn crop, seem to settle the mat-
ter that for generations to come
the staple business of the Iowa
farmer will be the turning of

corn into pork⁷¹ and beef. Several

questions have arisen from this state of things which are so vital to the farming interest that they call for settlement ^{at} an early date. It is generally conceded that by reason of their defective digestion, narrow chest, and great preponderance of bone over round and filloin, the native stock of cattle and swine are fed at a constant waste, and that breeds that are free from these defects must

take their place⁷². What breeds shall
permanently supersede
them, what shall be the coming
~~hay and the coming of~~, how can
the farmer obtain these improv-
ed breeds at less ruinous prices
than now, what system of treat-
ment and feeding will best suit
the climate and bring the largest
results with the least outlay and
since increase of animals engen-
ders diseases how can diseases
find find their prevention or cure?

^{73.}
Such questions as these are de-
manding an early solution
for the day is coming in Iowa
is indeed not very distant when
the native hog will wholly disap-
pear before an incoming pork-
er having the smallest limbs
and snout and the largest hams
and shoulders consistent with
use and safety, and when the
native cow with her pinched vi-
tals and gothic ribs will give place
wholly to the symmetrical Debon

or the magnificent short Horn.

And when that day comes
in Iowa, as come it already has
in England, then, in the preva-
lence of the valuable breeds,
stock breeding and judging will
be reduced to a science so nice
and exact that no man will dare
engage in it, without having first
come to a full comprehension
of all its underlying facts and
principles. And this necessity
urgent now, but specially imper-

75-
ative in the near future, the
Agricultural College has met-
ly providing for a chair in
Animal physiology and anat-
omy, a chair in Veterinary Science
and practice, including the
Laws of breeding, feeding, train-
ing and treatment of valuable
Animals, And as an indispen-
sable help to these noble studies it
has also gathered on the college
farm excellent specimens of the
breeds approved by the best breeders

of the country? ⁶ The Berkshire - the
Chester - the Poland China -
the Alderney - the Cuyahoga - the
Devon - and specially the Durham
are all to be seen there under the
care of one who knows well how to
bring them to their full perfection
of form and size. And consequent-
ly the student, who, under competent
instruction, goes to the bottom of the
sciences in question, enjoys the
advantage of the finest illustration
and with his scientific attain-

ments has daily corresponding
practice of the eye and the
hand. His powers of observation
of judgment and of reasoning are
all brought into play together.

If any better arrangement has
been made for preparing young
farmers to follow successfully
the business of stock raising and
feeding I know not - where on the
round earth it can be found.

All the studies I have named
are highly essential but one of

them, that of Veterinary Science is
as seems to me fundamentally
so. One cannot pursue it without
gaining a Knowledge of those col-
lateral facts that give quickness
and accuracy to the eye, when de-
termining the points of an ani-
mal - an accomplishment which
is indispensable to success in
buying or breeding. Then further
a more general proficiency in the
principles of Veterinary Science
for its own special purpose is of

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immense moment to the stock in-
terests of the country. What
large sums have been lost by the
death of rare and high bred an-
imals which ^{or} moderate knowledge
of the healing art judiciously
applied, would have saved. How
rarely stock raisers themselves
are able even to distinguish the
symptoms of various fatal dis-
eases to which their herds are liable.
How many quack horse doctors
have been tolerated and permit-

ted to collect⁸⁰ their extortionate
fees because of the denser ig-
norance of those who employ them.

Meantime the hog cholera, the
rinderpest, the Texas fever, the
black tongue, and the strange
horse disease commit their rav-
ages everywhere because in all the
length and breadth of the land
there is hardly a score of men
who are qualified by scientific
research to study these fatal mal-
adies and find their remedy.

I feel deeply and speak strongly
of this wide spread ignorance
and its attendant evils but cer-
tainly with no disrespect for many
excellent farriers who having
long experience are doing much
good. They are the exceptions and
not the rule. I look forward
with satisfaction to the time when
this wide deplorable want shall
be supplied in part at least by
those schools which are the pioneers
of the new education.

82
But before I ~~take~~ leave of this general subject I cannot forbear to give a more ^{particular} general glance at one of its divisions which by reason of its having received the earnest attention of many vigorous and learned men is specially fascinating. I refer to the breeding of domestic animals. What are called the Laws of inheritance whereby the same characteristics are transmitted from parents to offspring through many generations have

85.
But the branch of science
which is perhaps more prom-
ising and potent than any other
in guiding and stimulating the
farmers work is agricultural
chemistry. In all the great Laba-
ratories of the world it is busily
solving the most abstruse questions
of farm economy. It first deter-
mines for example the constitu-
ents of fat and then reveals by
analysis what cereals and roots
containing these constituents in

86
greatest proportion are consequent-
ly most valuable for the
production of pork and beef.

Having ascertained by similar
scrutiny what is lost in the fri-
tion of animal labor it declares
which of all the nutritious sub-
stances produced on the farm can
be best applied to the sustaining
of draft or speed. It actually finds
the scattered atoms of butter and
cheese in the plants and so dis-
closes from which of these they can

We most profitably gathered. It offers
 for the Milk Cow food so ex-
 actly suitable that what the
 mouth devours the udder restores
 in the largest measure of the
 richest milk. Investigating on
 the one hand the various atoms
 that compose the ^{Different} ~~varying~~ soils
 and on the other the varying at-
 oms that compose the different
 plants it settles with precision
 the suitability of every soil for
 its particular product and so

8.8
becomes an infallible guide in
the rotation of crops. This

wonderful Science presides over
all the numerous processes by
which the dead mould is changed
at last into the marketable com-
modity and shows how every one
of these can be conducted with
an exactness that ensures the
least possible waste of ~~muscle~~
~~and material~~. In every depart-
ment of agriculture it is evolving
into the clearest light principles

8.9
which experience has barely con-
pictured and observation
has outlined but dimly.

But before taking leave
of my Subject and my Audience
I cannot forbear alluding once
more, with professional pride,
to the reflex effect which this
special preparation for special
duties will have not only on the
economics of the farm and the
consequent increase of its pro-
ductiveness, but on the character

of the citizen⁹⁰ and the man. The
group of noble studies which
the new education offers even though
pursued by a limited number
is sure to reactuate in raising
the tiller of the soil as an entire
class to a higher intellectual plane.
Begin here
No longer then will he be compelled
to yield to the political juggling
by which inferior professions great-
ly outnumber his own in the
halls of legislation. The vast-
interests of agriculture underlying

and outweighing all others to-
gether will be adequately
and ably represented in the
councils of the State and the Nation
by the agriculturist himself.

~~Not~~^{now} then will he be compelled to
recite a geography which teach-
es that the river of Commerce rises
on the farm, runs towards the
city, and empties into its ocean
of fathomless wealth. But a new
map shall teach that this river
like the grand old stream in the

Land of flowers⁹², has a tidal flow
that sets backward to its very
Source and carries back to the
farm so much of the treasures of
the ocean as the ocean has received
from the treasures of the farm.

And the farmer's life
too will have a higher dignity
higher incitements, and higher
hopes. When Science joins hands
with experience and practice
on the farm, the wise transform
with magical touch, all its

grandest phenomena and as he
witnesses the miracle of an-
nual death and resurrection
in the vegetable world he shall
placidly await his own trans-
formation under a similar
order and his life, lofter, in
its aims, and happier in its
issues, shall proclaim through
all the land that farm life in
its better phases, is the truest
life that men can live and the
best emblem that earth can fur-
nish.

Wish of the higher life that
lies beyond -

