

On this CD are two Essays on Ignorance and Learning:. The first is:

ON NO OTHER PLANET

I like to stand in halls of learning.

Here learning happens.

I like to think of MYSELF as a hall of learning.

I do enough of it.

Oh, it's a humble hall I am.

**Nonetheless, I like to stand in my own midst sometimes,
and take some notice of what kind of learning this hall lets in
and what hospitality I lavish on migrant possibility.**

I've been a teacher.

I've been a student.

I've spent some time in higher education.

I have an opportunity today to opine,
And so I will: on learning, education, and this very planet.

I want to talk about what seems to be lost in education---
even in so-called higher education--- today

which is *the continual discovery of the joy of
learning.*

The Continual Discovery Of The Joy Of Learning

THE CONTINUAL DISCOVERY OF THE JOY OF LEARNING

Okay, I've said it three times.

As the least perceptive of students will inform you,
"continual discovery of the joy of learning comma the loss of in higher
education today"

is an odds on favorite for the final.

The speaker clearly is enamored of this topic...take note.
For isn't this how the game is played?

The grade-getting game...the answer-giving game.

I am obviously fond of hearing myself say something.

You note my repetitions, my raised voice, my deliberate inflection,
my gestural enthusiasm, my sincere animation.

You infer: this must be an important topic for her.

You don't know where I am going with this topic.

You don't know what I mean by the words I use.

Nor why it is important to me. Much less to you.

But your grade-getting radar is on full alert.

You infer: when the exam comes,

I bet she's gonna want me to parrot that phrase back.

If she likes to say it so much, she'll surely like my saying it.

In such a manner will I secure the grade I desire

and, in so doing, will I improve my life.

She, poor dear, can think she taught me something of import.

And so it goes...Mimicry 101...lose/lose learning.

I'm not against talking and I'm not opposed to listening.
I don't mind note-taking and I love a good lecture.

But sheer knowledge acquisition ---
especially of short-term, hastily stuffed, undigested, unsought,
unconnected, and unwanted factlets of dubious relevance---
is **not learning**.

Nor is it likely to promote learning.

Worse, mindless knowledge acquisition may
prevent learning

just because so many students think they *are* learning
when they binge and purge unabsorbed material.

Most of us who teach enjoy learning.

Most of us enjoy learning immensely
in one or more subject which is taught in school.
Our learning loves have shaped our lives, our careers.
We are school people all.
Many of us like people, we like learners;
thus, our lives are continual study sessions.

We seek not just to acquire information willy nilly
about old and new interests;
we seek to understand;
we love to explore;
we want to burst old barriers, immerse ourselves in puzzles,
ferret out new ways of seeing, doing, manipulating things.

We are self-motivated.

We are interdisciplinary.
We lose track of time; we get **excited** when we learn;

we love to share it.

We **expand** ourselves when we learn.

We **ANALYZE**: we take things apart;
we make distinctions; we order and re-order;
we calculate and pay careful attention to details;
we methodically examine what makes something tick, part by part.

We can do this with our bodies, in dance, for example
or in reshaping our golf swing. We can do this *musically*.

We can size up people and interactions tacitly without a word or a
theory.

We can search for a defect or a new approach to a jammed lock
or a new batch of clay
just by *playing* with it
in our sentient digits.

What else do we do when we learn?

We synthesize:
we place the new in contexts;
we examine consequences and spin implications.

We re-string the virtual tapestry of understanding over and over
as we *play* with foreground, background, conjectures, refutations,
questions, applications, counterfactuals, concerns.

Learning is child's play.
Children do it best after all.

It is both work and recreation;

sometimes drudgery,

sometimes *ecstasy.*

Learning is active.

It is interactive:

it changes the landscape of our thinking, doing, being, feeling, creating.

It is personal: *we change as we learn.*

Furthermore, what we do **not learn**

and what we choose not to learn,
how we do not learn,
and how we choose not to learn
shape us as well.

So it goes for individuals. Cultures. Disciplines. Professions.
And institutions.

Since I *love* to learn about many of the things I teach,

I have been very slow to appreciate
that others might not enjoy it just as I do.

I mean:

I have a hard time understanding
why someone would even want to memorize key phrases

when they could get in and *play* with the stuff---

really have *fun* with it.

I'm so keen on having *fun* with what I do

that it's hard for me to imagine
the corpus of knowledge ---
that is the dead mindless bits ---
without the vital mind play
and heart play
and spirit play
that I get lost in.

Here I am naive.

I have a ready mind...for certain things.
And a *zest for learning*...certain things.
And an impetuous sensibility...for certain things.
And I just happened to specialize in a bunch of those things.
So that I would have the darndest time not being fascinated,
not being avid,
voracious,
unfillable,
with *desire to learn more*.

And yet,
there are other areas,
I confess,

where I **refuse** to learn even the core,

kernel,
smallest factlet particle,
of something ---

software comes readily to mind ---
unless I am dragged
by sheerest, dire, and unavoidable necessity,
or a lot of people a lot bigger than I am
who control my paycheck,
to peck,

resentfully,

at some bounteous cornucopia of knowledge
which utterly *galvanizes*
my associates.

Okay, there...
there I'm a "Just give me the basics.
I don't wanna learn anything,
I don't have time for this,
it wasn't my idea to do this,
my self-esteem is below sea level,
and I'm suing you for mental cruelty"
kind of learner.

So I should be able to understand students
who don't want to learn

what I *love* to learn.

Sometimes I try.
Sometimes I succeed.

But --- because learning has been so *very, very good* to me---
I can't imagine education being based on anything other than learning;

I can't fathom how or why we could have gotten away from learning in
education.

*Especially since that's what
we humans have a life of
on this planet --- learning.*

But too many contemporary students
see education

as certification for future work
or appeasement of parental tyranny
or a truce with uncertainty.

They want to know what they "gotta do to get through it."

And from their vantage point
it's passing courses
which means passing tests
which means doing assignments passably
which means showing up, maybe.

It means "what do I **gotta do** to pass this class?"
class by class,

until I'm

"done."

Not a process.
Not a pattern.

Not habits, sensibilities, or *passions.*

Just stuff to get **out of the way.**

Because --- to be honest --- there's a lot of other stuff happening in life concurrently.

Now

many students have this Gradgrindian
mercantile mind set

because that is how college has been presented to them
from early on ---

- something you **gotta do** --- (hardly my favorite incentive!)
- **get** your degree --- (as in get a Big Mac and fries? in what? why?)
- **get** these units out of the way quickly -- (not enjoy Humanities, discover Geology)
- you'll need to know this if you go to college versus

in college you will have an *opportunity to*

explore...you'll learn how to learn.

And I *who am I* to them?

A fellow gourmand of my specialist feast?

A beacon of inspiration?

A personal trainer of the intellect?

No!

I am the principal **obstacle**

to getting this course over with.

If I am accommodating,
I'll make it easy
simple
safe
to get **outta here.**

“Just tell me what you want!”
students demand.

“Tell me what I'll need to know for the test.”

I want them to learn.
I want them to *love* learning.

I want them to **grow.**

I want them to *enjoy.*

And in so wanting,

I may be interfering
with their education
as they conceive it.

For if education
is to be gotten through
or gotten over with

and I require *learning*

which is *minds-on* and *personal*
and has *leaps* and *abysses*
and *terror* and *exhilaration*,
and is supposed to *incandescence* over a *lifetime*,

then “what I want them to learn”
is not so rote
not so safe
not so autopilot
as figuring out
what I want each and every one to reproduce for me on an exam.

“No fair!”

cry pressured, harried students.

***“Why are you making me do this?
I just want to know the answer.
The one you want and need.
I just need to know enough to give it back to you.
Don’t interfere with my education
by making me learn.”***

If that sounds like a parody,
it may be because education is often confused
with knowledge acquisition.

And yet, as we future-hurtled creatures know,
the corpus of knowledge changes,
while learning---

the *fun* we have on the way to getting knowledge---
is what we need to get good at.

For learning is what life demands of
us,
no matter how many units we've
acquired.

And when knowing
interferes with learning
we lose.

Now, although I am very fond of ignorance,
of which you will hear more,
I don't knock knowledge.

I protest merely that which inhibits learning effectively: including some
entrenched attitudes about knowledge, ignorance, and learning.

One of my favourite universities,
which long harboured, fostered, and, occasionally, bewildered me,
lists
the creation of new knowledge
and the dissemination of existing knowledge
among its prime objectives.

And yet,
and yet,

I am very, very concerned
that the public,
parents,
too many students,
and even some among our ranks,

identify *learning* with knowledge acquisition solely and simplistically.

Maybe you have to be a *philosopher*

to be concerned about this.

I mean, it doesn't sound all that bad.
It's not like cholera or missing "Home Alone 1200," after all.

What's the harm in treating learning and knowledge acquisition
as one and the same?

It's so nicely quantitative, after all...
fits into that "get those units of the way" calculus quite nicely:

"The more knowledge one acquires the more one learns;"
"The more one learns, the more knowledgeable one becomes."

But, as the Greeks would remind us
if they could but drag our attention to their written legacies to us,
there are many kinds of knowledge,

and all involve knowing how to *learn,*

appreciate,
produce,

and get better at some significant aspect of *living.*

What we call knowledge

--- so isolated, so inert,
so separate from acts of perceiving,
doing, valuing, making,
loving---

well even the ancients could see

that doesn't get us very far,
globally speaking.

For we on this bumptious planet need to look beyond knowledge
to understanding.

And beyond understanding to **wisdom**:
something of which we could use a great deal more on this planet.

Collette enjoined:

"Be happy. It's one form of being wise."

I rather doubt today's students
associate education with eudaemonia:
deep happiness, abiding satisfaction.

But learning and self-development
are programmed into our deep
structure,
woven through the human organism on
every level,

and it's a good thing
because life on this planet is one learning opportunity after another.

Do I hear any "Amens" to that?

So if I were to suggest what we might add to our educational process to put the continual discovery of the joy of learning back in the forefront, I would nominate ignorance: *vital, dynamic, productive ignorance.*

Yes, you did hear me correctly. *Ignorance.*

I mean we have plenty of it around.
Ignorance is interdisciplinary.
We'll never run out of it, cut funding as they may.

Ignorance has a bad press, of course.

And it, undoubtedly, harms, hinders, and confounds us.

And yet ignorance ---

in the sense of the unknown,
the refutable,
and the yet to be discovered

--- is the *source and the motivator of all learning.*

Ignorance and learning are indivisible.

After all, *we can't learn what we already know.*

Learning requires that we supersede our present knowledge base or skill level.

It's movement, a leap, or maybe a whole ballet ---
for learning is complex and multidimensional ---

beyond what we now know or can do.

To have learned is to have changed our previous status quo:

to have **grown**, leaped, refigured.

How?

By discovering, identifying, and incorporating
something we did not previously know
into our epistemic mix.

By definition, ignorance is simply non-knowledge:
the want or lack of knowledge, says Webster's.

But --- and here I know that this is coming at you a little quickly ---
for humans on this planet,
knowledge and ignorance are not absolute opposites,
not polar black and white.

For it takes knowledge to identify what we don't know.
And for everything we do know,
there are innumerable aspects of it we have yet to discover.

*The more we know about something,
the more we see
how much there is to know.*

As Blaise Pascal noted in the seventeenth century,
“As the sphere of our knowledge expands,
so does our contact with the unknown.”

Put bluntly:

- in order to learn, you have to be ignorant, and
- it is mindful exploration of what we did not previously know (or know how to do) that we count as learning.

What does this have to do with planet earth?

A lot.

To use a rural metaphor: it takes a whole heap of continuous learning to live a human life on this planet.

At least that's my experience.

“Education prepares us for the future.”

This truism,

or assumption, if you like,

underwrites higher ed recruitment literature,

appeals to legislators,

justifications of public investment,

and public relations/fundraising entreaties.

I may be picky,

but I'd like to see it writing: *whose future? where?*

I'd like the billboards, radio spots, bus benches, and alluring brochures to specify

on what planet the folks we now
educate will likely spend their futures.

As I see it, *the planetary variable*

is crucial for any “education as fitness for future” equation.

At least to date, the billboards
and appeals to the legislature
and recruitment materials
don't yet say that higher education

will prepare you only for your next job;

then all bets are off.

No, our task, as Margaret Mead put it,
is to prepare students for

what nobody knows now
and everybody in the future must know.

Hence, the emphasis on *learning how to learn*.
Thinking skills.

Qualities of mind.
Habits of life-long learning.
Readiness to try. Resilience. Precision. Discipline.
Enthusiasm.

Planetary awareness:

it is this
I recall to my students
under conditions of duress.

*What conditions, you ask?
What duress?*

Because ambiguity, complexity, and
uncertainty

are conditions of life on this planet,
and since thinking for oneself,
and working things through in one's own meaningful way,
are crucial for passing life's inevitable pop quizzes,

I do not want irrelevant memorization
to usurp the precious time, space, and energy
my students need to

think, imagine, falter, and leap,

to take some measure of themselves; to *defy* their fears and limits.

Sadly, however, the resulting lack of mindless algorithms
in my courses, the paucity of pat phrases and
the conspicuous futility of **probing my mind for the right**
answer

(i.e., the one I want everyone to reproduce
in advance
and without possibility of error,
originality,
or other deviance from my hidden canon of truth),
indeed, the very mindfulness
of tasks I require,
(out of respect for my students' considerable minds,
and for the advancement thereof:)

well, some students find my
non-rote routes to *leaping learning* "stressful."

I "make them think"

in class and on exams,

which cruel and unusual practice
introduces a level of indeterminacy
in subject matter, scope, and personal responsibility
which, they protest, is unfair to them;
is "stressful."

I can see their point:

many, indeed, feel aggrieved and unfit for the task of reading significant texts, thinking critically and creatively, weighing novel proposals, examining values, holding them to the light of their own experience, generating alternatives, speaking and writing with power, joy, and originality.

Parroting involves far less brain circuitry than understanding, responding, revising, and originating ideas, habits and passions.

Mimicry suffices to get things out of the way.

When my students engage me in this conversation,
I listen respectfully,
for thus have I come to understand and appreciate their conception of education, the future, and self-development.

Then I take a planetary poll.

I ask each student in turn
this question:

***WHAT PLANET DO YOU
PLAN TO LIVE ON?***

Most reply unequivocally,
albeit quizzically, registering slight to severe suspicion,
that they plan to reside on earth.

Every once in a while,

another preference will surface.

Which rather excites me,
for lo I lack the internal stuff
to be a brave pioneer.

When the circuit is complete,
I clarify:

*DO YOU MEAN YOU ALL PLAN
TO LIVE ON THIS PLANET?*

They nod.

*YOU'RE TELLING ME
YOU ALL PLAN FOR A
FUTURE ON EARTH?*

They have no trouble clarifying this point for me.

They hadn't thought about it much
but, yes, they consider themselves committed earthlings.

So I press on:

*YOU'RE NOT PLANNING
ON HAVING CHILDREN,
ARE YOU?*

They are, they tell me.

Well, maybe.
Don't tie them down, but more or less, they envision that.

*YOU'RE NOT PLANNING
ON GETTING MARRIED,*

ARE YOU? OR FORMING EMOTIONAL TIES WITH SIGNIFICANT OTHERS?

Well, they do see that in their future;
maybe not the exact form of relation

or the face,
but yes, they do plan to be involved with other humans.

AND YOU'RE NOT PLANNING TO WORK, ARE YOU?

Few see an alternative, actually.

**I JUST WANTED TO CLARIFY THE PLANETARY VARIABLE,
I say,
BECAUSE IF YOU PLAN ON LIVING ON THIS PLANET,
PARROTING WILL TAKE YOU TO THE NEAREST STREET
CORNER AND DUMP YOU.
THERE IS NO ROTE FOR MARRIAGE,
NO FORMULA FOR HUMAN RELATIONSHIPS.
YOUR JOBS WILL CHANGE DRASTICALLY OVER TIME,
AND CHILDREN WILL INTRODUCE A UNIVERSE OF
TRIAL BY FIRE,
FAILURE,
IMPROVISATION,
EPIPHANIES,
UNANTICIPATED DECISIONMAKING UNDER CONDITIONS
OF UNCERTAINTY---
IN OTHER WORDS, MASSIVE DAILY LEARNING---
WHICH CANNOT BE DOWNLOADED FROM ANY AVAILABLE
TEXT.**

IF YOU PLAN ON LIVING ON THIS PLANET,

I opine,

YOU HAD BETTER GET GOOD AT LEARNING,
YOU HAD BETTER PREPARE FOR AMBIGUITY, COMPLEXITY,
AND UNCERTAINTY,
YOU HAD BETTER GET USED TO NOT KNOWING WHAT TO DO
YET HAVING TO FIND YOUR WAY THROUGH
UNFAMILIAR, THREATENING, AND EXHILARATING
TERRITORY.

FOR THOSE OF YOU PLAN TO LIVE ON NO OTHER PLANET,
LEARN TO SCAN YOUR HEART, MIND, INTUITION,
EXPERIENCE;

PLAN ON CHANGING YOUR MIND;

DETERMINE TO GROW;

LEARN TO TRY, TO FAIL, TO REVISE;

PLAN TO ENJOY UNCERTAINTY,

FOR MUCH YOU WILL HAVE

IN YOUR YEARS ON THIS PLANET.

LEARN TO LISTEN;

LEARN TO LEARN BETTER ALWAYS,

ON YOUR OWN

AND IN COMMUNION WITH OTHERS,

**BECAUSE THIS IS WHAT LIFE ON THIS PLANET
REQUIRES OF YOU.**

*If you plan to live on no
other planet,*

EDUCATE YOURSELF FOR EARTHLING REQUIREMENTS.

And if you plan on living on another planet,

I applaud you,

I admire you,

and I know you will need more of the above tenfold

*for you who embrace the marvel and uncertainty of
the truly novel
the dramatic unknown
will learn more and better
than we who have,
nevertheless,
an infinity of unknowns on our birth planet,
our home turf.*

For verily I say unto you,

fellow learners,

how well has memorization served you
in your adult pilgrimage on this planet?

For *parents*, active or retired, to what extent has rote sufficed
for the unanticipated leaps and abysses,
for the terrors and exhilaration of family life?

For those with oft-changing job descriptions
in ever-changing institutions
replete with unpredictable demands,
opportunities, and dicta of the day from above, below, without---
how far does "autopilot" get you?

Not far.

Not long, not well

in this time and place

on this planet.

This is what my experience has taught me.

Oh I still,
resist Taoist sagesse bone deep and global.

But slow learner as I am, I get this much:

**effective education fits us for none other than
a human life,
matchless and unscripted,
which can be made,
lived,
on no other planet,
as on ours.**

Students must equip for their lives on this planet.

Not mine.

Not their parents,'
bosses,'

nor the plastic virtuals of media, commercialism.

For all its boredom and drear,

my life on this planet,
and yours, I speculate,

is fraught with *ambiguity, complexity, and
uncertainty.*

My senses are limited.

My experience is partial.

My powers of feeling, intuiting, perceiving,
comprehending, applying, synthesizing, revising,
are imperfect,

flawed,
fallible,

incapable of taking in,
much less understanding,

much less acting perfectly in the face of

**infinite experience,
vast and pervasive unknowns.**

You and I are finite; of this I am convinced.

The universe to be grasped greatly exceeds our abilities to grasp it.
As we share finitude, we share a ravenous capacity to learn.

By whose grace we experience novelty, surprise,
discovery, mystery, delight, terror, and incomprehension on

on a planet immense, imponderably fertile,
and, to degrees unknown,

impenetrable.

We who center the universe in our frail consciousness
are forever revealing and concealing ourselves,
even to ourselves.

*I expect our long-standing unknowing,
our zest for learning
and fondness for survival
have shaped being human on this planet.*

I surmise that learning is not a trivial human function,
not a temporary debility,
something to be gotten over

as quickly as possible
as we speed to a certain, secure future
devoid of ignorance.

Not on this planet, anyway.

Because there will always be far more that we humans
want and need to know
than we could ever store,
much less discover,
understand, and utilize,

we will always need our nimble *curiosity* ---

as well as the vigorous capacity to **err and learn from it**

with which our species is **gifted---**

and we cannot start too young
getting good
at these very real survival skills

for any future which we find
then make

on this planet.

Any system of education
which **FAILS** to hone,

which will **NOT** expand,
which **DEVERS** developing

pathways of learning---

replete with terror and exhilaration,
abysses and leaps
expected of,
required for

all learners as learners---

is not,

I submit,

suitable for public funding
by any country of means

on this very planet.

**THE CONTINUAL DISCOVERY OF
THE JOY OF LEARNING.**

is not only our birth right,
it is that distinctly human passion
which melds survival and flourish.

THE CONTINUAL DISCOVERY OF THE JOY OF LEARNING

is that which education
which fits us for the future
must foster.

*How did it begin
on this planet:*

THE PERHAPS UNPRECEDENTED CONTINUAL JOY
OF THE DISCOVERY OF LEARNING?

*Write your own story. Write a story a day. Celebrate it!
Here's my morning tale. Not to be memorized.*

This is how I like to imagine it...
the birth of the joy of the discovery of learning
on planet earth.

*It's an earthly tale I spin,
I'll make it earthy where I dare,
a point where terra firma takes a leap for joy
a jump into the beyond
the yet to be discovered.*

This is how I like to imagine it...

Were they vacuoles?
nematodes?
protozoa's papas?

Well...once upon a time,
a bunch of vacuoles were sitting around
just hanging out
I imagine them on a sort of protozoan auto pilot
not noticing much in other words
not registering much
not being as the Zens put it: exquisitely alert to momentary whatever
just barely vital

when, as the young now phrase it:

as if!

A monumental as-if flared...

One vacuole got a brief *as-if*

flick
flicker

there it went

a gleam
a stirring

of **possibility**

okay you say no big thing
this glimmer
this blip, stutter, billisecond of well...

novelty

and
you say:

*woman,
get a grip*

come on I retort

a conjectural moment
a contrapositive

big I call it

major I'm thinking
that's thinking, my friends,

well not cognition I concede,
but

that's **beyond** duh
that's well beyond the daily fare: deadly dull vacuole vacuum.

But that's not all,

of course,

for it's the *joy of learning* whose genesis I
imagine.

The barest of blips may suffice for gestation.
But I bet those blips of bliss
were worth sustaining,

so that *leaping* potential
became value added
for these early learners.

I have to believe the **conscious enjoyment** of new
of connections
of more than mind numb

was addictive
enviable
contagious
highly prized.

Perhaps, in time,
bolder organisms hoarded energies
for a few sacred moments of primeval scholarship:
lying around the surface
just hanging out like everyone else
not doing much
not noticing not aware beyond auto pilot
and then

voila!

movement

in two directions:

- one digs *beneath* the surface
- one takes a *leap* of faith.

It ain't much you submit.

Who knocks betterment I want to know.

Alchemy

Lotions

Potions

Strange Notions

It's all chemicals, they say.

BRAVO

for

voracious vacuoles

vital vitalistic vacuoles

learning-loving liposomes

*or whoever leaped their all
into mystery*

without support mechanisms

grants

parental approbation

and formal certification.

Bless the beginners

Bless the persisters

*and bless we who are
really good at learning now,*

**by our very nature
riddled with synapses and well connected.**

*I repeat that I am honored to be here:
with you who conduce learning.
I lament that we the public seem to have forgotten
what a privilege it is to learn
and how vital true learning is
for life on this planet.
Persist with us, I beg you.*

**For on no other planet
is our learning needed as here.
On no other planet
will we have the time of our lives.**

*It is very late in our history,
wasteful of our ancestral investments,
and ruinous of our potential,
to have descended
voluntarily
within academe
below the level of the vacuole
who
first cherished
the inimitable joy
of the discovery
of learning.*

**To know how good it can get on
this planet
we must be as good as we can get.**

And education,
our formal societal commitment to learning,
must be every bit as good as it can be
if we are to pass on,
burnished and emboldened,
that ever-potentiating legacy:

*the continual joy of the
discovery of learning.*

ESSAY II. DE-BUGGING IGNORANCE

*Every time I want to learn,
I need to jump.*

Jump where?

Into ignorance.

***Ignorance?* You might reply...**

Why Ignorance?

**If you want to get somewhere;
if you want to progress...
Ignorance is a dead-end. A defeat.**

**If you want to learn better,
shouldn't you aim to become less, not more,
ignorant?**

I admit it: ignorance is a state we avoid.

I did, for many years. But no longer.

In software-speak: ignorance was once a BUG in my knowledge-system. Now it's a FEATURE of my learning-system. This was an important upgrade for me, and I recommend it.

After all, I do want to learn, and, as Sacha Guitry observed: "Everything I know I owe to my ignorance."

No longer concerned to de-bug my learning system --
- to purge it of ignorance --- I find the unknown more
fertile, more "user-friendly;" I open myself to its gifts.

As to "bugs" and "features"...

Bugs are awkward moves, sticking points, obstacles to ease, flexibility, and function in software systems. Designers try to eliminate or minimize bugs. Until recently, the ignorance of neophyte computer users was a "bug" for software specialists. Over several decades, experts had developed systems of greater and greater capacity and sophistication for intelligent users. Often, skilled and savvy users drove systems innovation; systems assumed user-expertise. However, as computers came into wider use, to the delight of manufacturers, designers encountered a population with no desire, indeed no patience, to become computer experts.

Busy ignorami did not want to learn computer-speak. Toggles, kilobytes, ROM, and CMOS failed to allure them. Most didn't care if their neighbor's system had more RAM than theirs, as long as the computer did what it was supposed to do, and minded its own business. Willfully ignorant consumers, large numbers of them, refused to become "computer jocks."

And, after a while, the industry tilted in the direction of the naive user. Since the "bug" of non-expertise could not be eliminated without sacrificing market share, software specialists changed their systems to accommodate the bug. Software became more and more "user friendly." Systems were more valued----

more marketable ---- the *less* one needed to know to use them.

*Thus the ignorance of the user,
once a major "bug" in systems design,
became a desired feature of new systems.*

In this case, life IS like software. Faced with a workable system, we strain to eliminate bugs. But every now and then --- perhaps as a result of trying-in-vain, unanticipated innovations, or market forces --- we see a bug's potential. We notice less what the bug obstructs than what it enables. The "bug" generates possibilities...which makes us wonder if it's really a bug after all. We may re-classify it: as an initially annoying invitation to upgrade. In some cases, the once-bug becomes a valued "feature" of an improved system. In life as in software, we relish "grace moves": among which we number turning a bug into a feature.

Ignorance was my bug for many years. I felt if I could just get around it, I would be knowledgeable. I would be competent, safe from the sting of not-knowing, nobody's fool. Try as I would, I could not get around ignorance, I could not eliminate it. The harder I tried, the more scared I became, the less open I grew, and the less I liked myself. My enthusiasm, my self-confidence dwindled. My creativity ebbed. I was in a rut. A fear

rut. An avoidance rut. I thought the problem was my ignorance. As I see it now, my "bug" was my fear of ignorance: a burdensome block to learning, of which I was largely unaware.

Eventually, I came to study philosophy, and in particular epistemology, the theory of knowledge. Reading brilliant philosopher after brilliant philosopher dispute the rest, century after century, millennia in and millennia out, I was struck by how little these thinkers thought we could know for certain, and how meticulously they diagnosed our limitations. In time, insights sparkled above the battlements. The epistemic dance itself intrigued me. After years of killing perfectionism, I slowly loosed my need to find the absolute truth, to claim it for myself. I dared to wonder if my "bug" --- ignorance --- were not humans' proper sphere; almost a philosophical necessity. And I marveled, as I still do, at how well humans function in the face of massive unknowns, we who must learn to survive. We learn, not infallibly, but astoundingly well.

I didn't realize it at first, but the metamorphosis of ignorance from bug to feature paralleled a system shift. My focus had shifted from the empty, swept, and garnished halls of knowledge to the messy, lived-in den of learning. If knowing is a pristine and timeless achievement, learning is a "most admired disorder." Not tidy, not predictable, not closed, learning is

marvelous in the Medieval sense: miraculous, full of wonders, something to marvel about. Fecund and disheveled, learning presupposes ignorance. *Learning requires ignorance.*

What is ignorance?

Dictionaries agree: it is the want or lack of knowledge.

But what is knowledge?

Philosophers have disputed this very question for millennia, agreeing only to disagree about nearly everything. Nevertheless, if we settle for the dominant view that knowledge is true justified belief and truth is timeless, knowing's domain is miniscule.

Why?

- ♣ Since we finite human beings have at best time and means to demonstrate the truth of only a few of the infinitely many true propositions about the universe, and these only tentatively, there will always be infinitely more true things than we can be said to know.
- ♣ Because all proposals are potentially corrigible -- subject to revision, refinement, or rejection over the course of human study of the universe -

-- we must admit the possibility (however bare) of being wrong about any or all items of current knowledge.

In other words, because the universe so far surpasses our potential to comprehend it, fallibility, incompleteness and infinite revisability will always characterize the best of human hypotheses and the whole of our learning.

Why?

As humans, our abilities to perceive, conceive, and comprehend are limited. Our perspectives are partial, our understanding incomplete. Moreover, since we cannot know what we cannot know, we cannot see beyond our limits. Thus we are, and will likely remain, ignorant of "epistemic basics" --- the foundations of our knowledge and the ultimate truth of our many claims to know.

Lest the discussion grow too abstract, let us compare limits of seeing, with which we are familiar, with limits of knowing.

We humans can see some things; we cannot see others. We see as we do because our eyes and brains are constructed as they are. Some animals see things we do not. Because we have studied what and how some

animals see, we realize that we do not see all there is to see. We understand, at least to a small degree, why we cannot see things other creatures can. Our seeing equipment converts stimuli into signals it can handle, limiting and distorting input as it processes. What we see is not all and not exactly "what is there." Bottom line: Our vision, and hence our visual perception of reality, is limited, even distorted. *Reality exceeds our perceptual grasp.*

Microscopes and telescopes extend our capacity to see. They also remind us that what we don't see or don't know may be much larger and more important than we had imagined. Before Galileo trained his pioneering telescope on Jupiter, we did not know it had moons. They were there, of course, but too far away for us to see them with the naked eye. Unaided vision cannot detect them. In consequence, not only were pre-Galileic astronomers ignorant of the existence of Jovian moons, they were ignorant of their ignorance of them. They didn't know enough to know that their maps of the solar system --- which showed the earth's moon and no others --- were inaccurate.

Before Galileo, our moon was thought to be a silvery disk, made of metallic, incandescent material, wholly different from the dense, pitted surface of the earth. And so it appeared to be. Yet Galileo's telescope

revealed a lunar terrain much like earth's: a dull, cratered crust, not smooth at all, and not inherently shiny. Increasingly sophisticated optics have extended the limits of astronomical observation, as have computer revolutions. Always, the "enlarged universe" reveals unanticipated surprises. With each leap, "the bigger picture" makes a mess of current dogma: earlier observations and theories, based on then-good evidence, are found to be limited, distorted, in need of revision.

Now, as in Galileo's time, we don't always welcome the re-view and re-think of our "workable" systems which upgrades require. Indeed, Galileo's observations, while testable, were rejected by many of his peers. Why? Because they challenged what had been unassailable: ocular evidence. Moreover, many contemporaries did not want to view their settled world through Galileo's discomfiting lens. They did not want to see it differently. Not a few chose not to see; not to learn. They clung frantically to what Galileo had exposed: ignorance of their ignorance.

To cite another visual analogy: before the advent of microscopes, physicians and scientists worked without suspecting the vast microbial world, which sustains us. Viruses, bacteria, DNA --- the stuff of modern medicine --- were not only unknown, they were undreamt of.

Until we stumbled into the microscopic universe, we had no idea how much we were NOT seeing. What's more, without the microscope's wholly unexpected midwifery, we could grasp neither the existence of this hitherto-unsuspected realm nor its importance for health and medicine. But lest we castigate ages past for their ignorance, and little suspect our own, we have William James to thank for this pithy reminder of learning's "endless frontier":

Think how many new conceptions have arisen in our own generation, how many new problems have been formulated that were never thought of before, and then cast an eye on the brevity of science's career...Is it credible that such a mushroom of knowledge, such a growth overnight as this, *can* represent more than a minute glimpse of what the universe will really prove to be when adequately understood? No! Our science is a drop, our ignorance a sea. Whatever else is certain, this at least is certain, that the world of our present natural knowledge is enveloped in a larger world of some sort of whose residual properties we can at present frame no positive idea.

James is right: ignorance is not a lack. Not a void. It is a plenum: full and fertile.

Immeasurably rich, immensely rewarding, the domain of ignorance is vast and vital. It is dynamic: it changes with inquiry.

Not only can we not avoid ignorance, we would be foolish to try. For learning itself depends on ignorance. After all, we cannot learn what we already know.

Without ignorance, there could be no discovery. Ignorance --- the unknown --- is the terra incognita of discovery, invention, and creativity. Every time we learn, every time we discover, every time we create or invent, we do so in the domain---and by the grace --- of ignorance. Learning, our unending expedition, is a continual encounter, or --- to put it more accurately --- an inexhaustible alliance with ignorance.

Ignorance and knowledge are not incompatible opposites. They are not antagonists. Not even separable. The "comic western" dualism of ignorance versus knowledge, in which ignorance plays the villain to knowledge-as-hero, is too simplistic to account for our variegated experience, our full symphonic living. It is a familiar scenario, but flawed: education as strife; ignorance versus knowledge; black versus white; bad versus good; shameful versus laudable. We gifted juveniles know better: only ignorant people can learn. Learning thrives in love, not in war.

We have inherited our polar notions of knowing and not-knowing, and attendant militarism, from ancient philosophies, which denigrate the physical world and our sensate capacities. Like dutiful but misguided children, we impose otherworldly thought and language on this-world's motley experience. To our cost. Unawares, we hinder our learning. We distort our understanding of our processes, depreciating our gifts.

Decidedly, it is time to upgrade.

Knowing and not-knowing are intertwined. They are symbiotic.

For it takes knowledge to acknowledge ignorance.

To inquire, we must face what we do not know.

If we knew all, we would not need to learn.

If we knew all, there would be no motive, no object for inquiry.

If we knew all, we would have no mystery, no wonder, no chase.

But we do not know all: not about nature, not about anything. For an imperfect species with imperfect powers and nearly insatiable curiosity, ignorance and learning entwine. Each requires the other in order to exist. It requires understanding, sometimes a great deal, to be aware of what we do not know. The better we

understand something, the better we understand how little we know about it, and how much we have to learn.

That is why "experts" in a field acknowledge more ignorance --- more questions, more unknowns-to-be-sought --- than the rest of us. Nobelists, for example, transcend knowledge of the day. Pursuing more worthy quarry --- unanswered questions, suggestive hypotheses, and pregnant puzzles --- they jump into uncharted terrain: ignorance. In such minds, questions multiply and fertilize. Answers biodegrade quickly. Avid ignorami ask far more questions than they can answer because questions fascinate them; because questions alert them to unknowns of importance; and because questions tend to attract answers, sometimes very far down the road.

Enlightened ignorami neither deny nor despise their ignorance. Rather they look for it. They use it. Awareness of ignorance occasions inquiry, and fuels it.

Understanding, often identified with knowledge, might better be described as a productive relationship between unknowners and the unknown in which old "knowns" topple as new insights uncover fresh areas of ignorance to be explored.

Science, for example, is no straightforward accumulation of facts, no linear revelatory ascent. No, it

far more exciting than that. Far more human. Science is an epistemic odyssey: a journey toward knowledge. But its home territory is the unknown. Scientists proceed from a need or desire to know: from acknowledged ignorance. But as they investigate, the ground shifts; the target is dynamic. Exploration of known unknowns reveals unknown unknowns. New findings overturn accepted facts and frameworks. Questions turn into answers; answers into questions; and on the cycle spins: through unanticipated paths, detours, retreats, and advances.

And what is true for science is true for all learning. It is messy, enticing, provisional, unending. It is a chase, a quest, a human avocation. This is one reason why experienced learners do not collapse when their "solutions" do. We, too, have what it takes to learn boldly: creativity and ignorance --- two abundant, self-renewing natural resources. Moreover, ignorance is a growth industry. Its inventory encompasses much of what we now claim to know; all we will discover; all we will recant; and everything to be puzzled at.

For an inquiring mind with limited powers and propulsive curiosity, this means that nearly something about nearly everything is fair game for an active ignoramus.

learning --- that dynamic interplay of questions and hypotheses, wonder, mystery, failure, invention, revelation, and frustration --- finds in ignorance a powerful, unacknowledged muse.