

## Meeting 12 • 13 February 2014

**Week 5: Animals – Getting beyond Monsters, Jaguars, Eels, and Bambi • Week 6: Rocks & soil; measuring the land**

Version:  
2/13/14

pictures of the week



uakari monkey, based on a sketch by Humboldt



Humboldt's map of the Casiquiare Canal/Channel

thought-bite of the week:

**"Rivers have only a slight, often imperceptible fall... We stopped by the mouth of the Caño de la Triguera... to measure the speed of the current, which was 2.56 feet an hour."**

(Humboldt, "Personal Narrative", from *Jaguars and Electric Eels*, ed. & trans. Wilson, p. 49, 67)

mini-text of the week (start):

**"In this interior of a new continent you get used to seeing man as not essential to the natural order..."**

Humboldt, "Personal Narrative", from *Jaguars and Electric Eels*, ed. & trans. Wilson, pp. 99 ([read more](#))

### Topics for today (key to symbols)

• (10') This week's thought-bite: the constant measuring and the tiny gradations; Lewis & Clark and the Willamette; science shows that Kansas is as flat as a pancake.

Request about keeping small-group discussion down to a loud roar and then quieting back down for full-group learning.

Groups do quick estimates / calculations and then report: How flat (even) is the surface of the Earth compared to an orange? How thick is the atmosphere compared to the peel of the orange?

Followup about words for "science", "scientist", and the specific sciences: "physico-mathematicall experimental" (Bryson, book about Royal Society). Sources of information about: the history of words – the Oxford English Dictionary (OED); and the state of knowledge "back then" (=1800) from its own perspective – The *Encyclopédie* (1751-1772) of Diderot & d'Alembert (Wikipedia; • complete French text in e-facsimile • PSU has it as ink-on-paper facsimile)

• (10') My recent reading: a) what geology and paleontology tell (and don't [yet] tell) us about

climate change as much as a billion years ago; b) editor of skiing mag pushes for more attention to global warning (NYT article "The End of Snow" by Porter Fox). How far are we ourselves qualified to judge the science, and how far must we take the "facts" and "data" on "faith"?

• (15') triangulation, including hands-on measurements of distances, heights, etc. Concept of on-demand vs. curriculum-embedded learning. Pre-Egyptian principles / tools / standards: height of vertical structure (tree, building); distances on the ground, especially in rough territory; why fiddle with barometers to measure the height of a mountain when all that nice trigometry is available?

• (10') An example of a very different course / project that relates to sustainability (and distant lands), and also illustrates how valuable are having many different kinds of knowledge / skills, and also teamwork and individual initiative

• (05') About reading: allocating time, streamlining what you read, taking (mental) notes

• (10') Let's support the midterm by looking at AvH pics - the ones that have been on every meeting outline.

Check your progress – and explore the related issues of standards, assessment and grading by exploring this [self-evaluation guide for the middle of the term](#); this applies to your recent writing assignment, to your performance in the course, and to your larger roles as citizen and (possibly) parent.

• (05') Prep for species descriptions, group projects, and even the book review activity: What about AvH's life and work might spark interest in: 1) AP students of various subjects; 2) middle-/high-school boys, especially non-privileged/minority learners (and especially ones that have unduly high self-images); 3) elementary school girls; 4) special-needs learners; 5) school teachers and administrators; 6) communities that could be linked to H?

• (0') Use your computer/ smartphone map links and applications to trace AvH's route in South America, starting with his travel up the Orinoco and down the Amazon. See Helferich, p. 52 map, but be aware that some place names have been changed over time.

Looking further ahead (projects, etc.): presentation (continuation) about educational standards and their parts in the course: 1) Improving your learnign by helping others to learn - how standards are used to develop curriculum (curricula?) and learning activities. Example of [source of lesson plans](#); article (H0152) "School Gardens Blooming Teach Lessons On Nutrition, Environment, Science, Teamwork". This is preparation for assignments about species description and group projects.

looking ahead: presentation of project ideas (just the ideas, not finished projects) in week \*\*

Later: what it's like to read Darwin; Humboldt-named species; forming teams and scoping out projects ([ideas for group projects](#)); the iconic graphic of Chimborazo; apps Humboldt would have liked; what shall we do with (to??) the people who haven't revealed their interests and strengths and don't get "on board" when they're needed?

deposits cannot be reliably dated. Even with the rapidity with which glaciation and deglaciation are thought to have happened, for it to be global, it would have to be long lasting, in the order of 10 million years. Again, timing is problematic without good dating and it is now turning out that some sections have several diamictites (glacially derived sediments) interlayered with sandstone strata, which does not seem to fit the expected pattern. The radical changes in carbon dioxide levels should be reflected in the rock record, along with evidence for greatly enhanced weathering. New measures of weathering derived from independent isotope studies (of the element strontium) do not support the very high levels of weathering suggested by the model.

The main sedimentary signatures of late Proterozoic glaciations are first pebble-filled mudrocks that are called diamictites, and in this context they are interpreted as glacial in origin. Unlike deposits of the geologically recent Pleistocene ice ages, these ancient diamictites are invariably sandwiched between limestones that form the second signature. The limestone strata were deposited as carbonates characteristic of warm waters and warm climates, with virtually no intermediate sediments in between. In addition, there are some sedimentary iron formations that are making their last appearance in the rock record.

The discovery and interpretation of some late Proterozoic-age diamictites as glacial deposits was fundamental to the claim that there had been glaciation in this interval of Earth Time. For some diamictites there is no doubt about their glacial origin. They not only contain ice-scratched angular pebbles and boulders, but they are also associated with other glacial features such as glacially striated rock pavements and dropstones. The latter are pebbles and boulders that have fallen from sea ice into more normal marine sediments. However, in the rush to join the Snowball bandwagon, many other diamictic conglomeratic sandstones have been called glacial, with very little supporting evidence for the attribution. Critics of the 'full-on' Snowball theory claim that out of 85 diamictite deposits from around the world, dated at between 800 and 500 million years old, only some 16 are reliably glacial in origin.

The presence of limestones immediately adjacent to the diamictites is part of the supporting evidence for low-latitude positions of glaciated regions. Furthermore, the reappearance of limestones immediately after the diamictites

*Climate change ca 1 billion years ago -  
How May researched it*

seems to indicate very rapid climate change. However, the composition of the limestones is not exactly the same. Analysis of their carbon isotopes shows that there was a considerable organic contribution from sea-dwelling creatures to limestones found below the glacial deposits, but very little contribution to the limestones immediately above.

High positive carbon isotope ratios in limestones are also associated with large areas of shallow tropical seas. And these in turn are more abundant when supercontinents such as Rodinia rift and break apart. During such rifting, the total length of coastlines more than doubles as shallow seas flood around the margins of the new, smaller continental blocks or plates. The high rates of burial of organic carbon also locked up very large amounts of atmospheric carbon dioxide, contributing to the ice-house effect with its rapid and drastic cooling leading to a glacial event. Then, if the glacial event was globally extensive, the covering of sea ice would have shut down primary production in the oceans and led to the shutdown of marine ecosystems.

By contrast, the cap limestones above the diamictites generally have very low negative carbon isotope levels. At first these negative values seemed to agree with the Snowball model, in that they suggested continuing low organic productivity in the oceans, thus the organic component. Alternatively, the postglacial ocean may have continued to be depleted in the kind of organisms, such as cyanobacteria and algae, which were the source of the organic carbon.

However, recent more detailed analyses show that the lower strata of the cap limestones exhibit high positive ratios and the negative excursion does not 'kick in' until some way through the deposits. Depositional rates of the limestones could have been enhanced as a result of rapid heating of tropical waters and greatly increased biological productivity. But at the same time, increased weathering of continental rocks removes carbon dioxide from the atmosphere.

The removal of large volumes of this greenhouse gas would have led to global cooling. Descent into an icehouse state would have initiated glaciation. Another possibility that is much in vogue at the moment is that large quantities of methane, which has low carbon isotope values, were suddenly released from permafrost sediments that contain large volumes of frozen gas hydrates such as methane.

However, recent more detailed sampling and analysis of the distribution of carbon isotopic values through the carbonates show some puzzling complications. Positive values continue upwards into the base of the carbonates immediately above the glacial deposits. This strongly suggests that, contrary to what has been claimed, there was continuing organic production through the glacial phase. Furthermore, the claim that the brief negative carbon isotope 'excursion' was related to increased weathering has not been supported by analysis of strontium isotopes, which are also involved in the process.

Iron-rich sediments were last seen around 2 billion years ago in Earth Time and their reappearance at this late stage, when levels of oxygen in the atmosphere and oceans were close to those of the present, might seem rather strange. The answer given by Paul Hoffman and Dan Schrag, some of the main promoters of the Snowball Earth hypothesis, is that a covering of sea ice shut down the primary production of oxygen in the oceans by photosynthesising micro-organisms such as algae and cyanobacteria. Furthermore, they claim that the 'icing' on the oceans also prevented the diffusion of oxygen from the atmosphere into ocean water, promoting the deposition of iron-rich sediment in ocean waters.

That there were significant glacial events in late Precambrian times is not in doubt. But recent detailed examination of some of the critical evidence for their extent and influence on life does not seem to be quite clear cut as originally 'advertised'. There is certainly good evidence that there was no total ice blanket, there were probably significant 'uniced' areas of landscape and open areas of ocean, and life was not shut down. The Snowball Earth hypothesis has not melted away, but it is in the process of reinvention and transformation. So far, the Canyon deposits do not provide evidence for these events, but there is geological evidence not far away in eastern California.

### California fills the gap

In California, sedimentation continued from late Proterozoic times right through into the beginning of the Palaeozoic Era and its initial period, the Cambrian. Altogether some three kilometres of Neoproterozoic sediments (ranging in

age from 1.0-0.542 billion years ago) accumulated in shallow marine seas, depositing sands, silts and carbonates with the occasional invasion of land-derived river-borne sediment from the east and southeast. Most interesting of all are strata known as the Kingston Peak Formation, which includes sandstones, volcanic rocks and limestones with different kinds of conglomerates, including a diamictite. Overall, the strata result from the rifting apart of Rodinia and crustal stretching around 700 and 600 million years ago.

In Death Valley National Park, near Saratoga Spring, diamictite conglomerates can be seen to contain a variety of pebbles of different size, shape and composition, all 'floating'; that is, surrounded by finer-grained sediment. These characteristics are very different from those of a typical beach conglomerate. Instead, they reflect deposition from sediment-laden and land-derived ice as it floats out to sea and melts. Similar diamictites are found in the nearby Ibex Hills. Limestones typical of wave- and current-agitated shallow, warm waters occur below and between diamictite horizons. The sequence is capped by another kind of limestone known as the Noonday Dolomite. This was also deposited on a shallow marine continental shelf margin, but in quiet waters with thin rhythmic layering thought to have been produced by the growth of algal mats over the sediment surface.

Measurement of carbon isotope values through the limestones shows positive values below, between and immediately above the diamictites. The only negative values are found higher up in the Noonday Dolomite, repeating the distribution seen in similar rocks in Namibia and Australia. So these late Proterozoic deposits repeat the pattern that has been found worldwide at this level and that is seen as evidence for an extensive if not necessarily global ice age at this time.

The uppermost, postglacial sequence of Proterozoic strata in Death Valley is called the Stirling Quartzite. It was from here that some of the oldest fossil shells in the world were found in the 1960s and 1970s. They are therefore of considerable interest.

For around 200 years one of the base lines of historical palaeontology has been the argument that the fossil record of shelled organisms begins with a 'bang' or explosion in diversity at the beginning of Cambrian times. Hundreds if not thousands of fossil collectors around the world have spent vast amounts of effort



SUNDAYREVIEW | OPINION

# The End of Snow?

By PORTER FOX FEB. 7, 2014

OVER the next two weeks, hundreds of millions of people will watch Americans like Ted Ligety and Mikaela Shiffrin ski for gold on the downhill alpine course. Television crews will pan across epic vistas of the rugged Caucasus Mountains, draped with brilliant white ski slopes. What viewers might not see is the 16 million cubic feet of snow that was stored under insulated blankets last year to make sure those slopes remained white, or the hundreds of snow-making guns that have been running around the clock to keep them that way.

Officials canceled two Olympic test events last February in Sochi after several days of temperatures above 60 degrees Fahrenheit and a lack of snowfall had left ski trails bare and brown in spots. That situation led the climatologist Daniel Scott, a professor of global change and tourism at the University of Waterloo in Ontario, to analyze potential venues for future Winter Games. His thought was that with a rise in the average global temperature of more than 7 degrees Fahrenheit possible by 2100, there might not be that many snowy regions left in which to hold the Games. He concluded that of the 19 cities that have hosted the Winter Olympics, as few as 10 might be cold enough by midcentury to host them again. By 2100, that number shrinks to 6.

The planet has warmed 1.4 degrees Fahrenheit since the 1800s, and as a result, snow is melting. In the last 47 years, a million square miles of spring snow cover has disappeared from the Northern Hemisphere. Europe has lost half of its Alpine glacial ice since the 1850s, and if climate change is not reined in, two-thirds of European ski resorts will be likely to close by 2100.

The same could happen in the United States, where in the Northeast, more

than half of the 103 ski resorts may no longer be viable in 30 years because of warmer winters. As far for the Western part of the country, it will lose an estimated 25 to 100 percent of its snowpack by 2100 if greenhouse gas emissions are not curtailed — reducing the snowpack in Park City, Utah, to zero and relegating skiing to the top quarter of Ajax Mountain in Aspen.

The facts are straightforward: The planet is getting hotter. Snow melts above 32 degrees Fahrenheit. The Alps are warming two to three times faster than the worldwide average, possibly because of global circulation patterns. Since 1970, the rate of winter warming per decade in the United States has been triple the rate of the previous 75 years, with the strongest trends in the Northern regions of the country. Nine of the 10 hottest years on record have occurred since 2000, and this winter is already looking to be one of the driest on record — with California at just 12 percent of its average snowpack in January, and the Pacific Northwest at around 50 percent.

To a skier, snowboarder or anyone who has spent time in the mountains, the idea of brown peaks in midwinter is surreal. Poets write of the grace and beauty by which snowflakes descend and transform a landscape. Powder hounds follow the 100-odd storms that track across the United States every winter, then drive for hours to float down a mountainside in the waist-deep “cold smoke” that the storms leave behind.

The snow I learned to ski on in northern Maine was more blue than white, and usually spewed from snow-making guns instead of the sky. I didn't like skiing at first. It was cold. And uncomfortable.

Then, when I was 12, the mystical confluence of vectors that constitute a ski turn aligned, and I was hooked. I scrubbed toilets at my father's boatyard on Mount Desert Island in high school so I could afford a ski pass and sold season passes in college at Mad River Glen in Vermont to get a free pass for myself. After graduating, I moved to Jackson Hole, Wyo., for the skiing. Four years later, Powder magazine hired me, and I've been an editor there ever since.

My bosses were generous enough to send me to five continents over the last 15 years, with skis in tow. I've skied the lightest snow on earth on the northern Japanese island of Hokkaido, where icy fronts spin off the Siberian plains and

**About reading: allocating time, streamlining what you read, taking (mental) notes** last modified: 2/13/14

The course reading is chosen from materials that are not at the professional "academic" level, but rather that of the college-educated citizen. There is some range: the "Eels and Jaguars" book would not be inappropriate for a smart elementary-school child. The Helferich book is well written and solidly research, but it would not be acceptable in a 400-level history course. The Stegner book is more ambitious than the Helferich book, but like the Helferich book it contains a good deal of adventure narrative, and Stegner writes about places and times more familiar to contemporary Americans, including Oregonians. The scientific and cultural issues that Stegner presents are also more familiar to us.

An impartial poll of post-college citizens in ordinary occupations (non-MD health professionals, airport baggage handler, businessman, members of a woman's reading club) confirms that a book like the Helferich can be read comfortably in 5-6 hours (around 2 minutes a page).

Here are some tips about reading our materials:

- 1) Prioritize your reading: Yes, the adventure tales are entertaining and help us feel what it would be like to be there, but you may want to zip through them (but look for extreme situations). Our course emphasizes sustainable environmentalism, particularly about climate change and biology, so read those parts in more detail. Same thing for when you encounter the social and political factors, and how data was gathered and evaluated. Go somewhat light on the geology and chemistry than biology and meteorology, even lighter on the ethnology and archaeology (but remember that real people are involved, and that there is an academic field of cultural sustainability).
- 2) If you feel you have a handle on a topic, and that the passage you are reading is just more of the same, move on to new kinds of knowledge.
- 3) Look for parts where major topics are integrated: acquisition of scientific information, attempts to apply it to natural and social problems, and disputes about evidence, method, and consequences.
- 4) Look for parts where the work which Humboldt helped to conduct has remote but clear effects on later times and other places, particularly the US west of the 100th meridian, and the present time, whether in the West, the larger US, or the entire world.
- 5) Look for examples of what was regarded as solid science then turns out to be in need of revision or rejection by later science, and how that later science argues its case.
- 6) As you consider the information from the past and from other places, remember that Then and There are/were different from our Here and Now. Recognize the huge differences, and remind yourself not to force the world-view of the Here and Now onto the Then and There.
- 7) Every now and then write yourself a little note about something you've learned, maybe with an eye to bringing it up in class.
- 8) Assume that the course meeting handouts contain useful information, including the supplementary materials like news and magazine articles.

9) Don't get obsessive about details of knowledge. Most activities, including the major projects, are open-book/internet. While the tests aren't, success on them does not depend on (to quote an old TV quiz show) "detailed recall of specific facts". You won't be asked to give the precise altitude of Mount Chimborazo, or the Latin names of 10 Humboldt-related species. But you will be expected to understand why Chimborazo and similar places are important to the Origins of Sustainable Environmentalism, and to explain that you will need to have learned some bits of specific knowledge and be able to organize them to support the case you are making.



Oregonian Feb. 7, 2014 B5

# Oregon's test is wrong, not the children

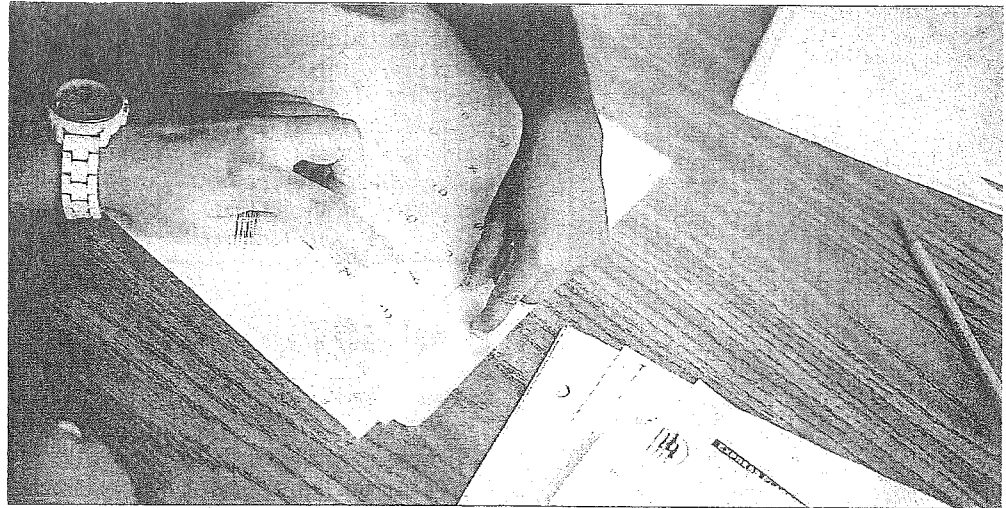
STEPHANIE FEENEY

IN MY OPINION

A recent front-page article in *The Oregonian* states, "Kindergarten test results 'sobering'" (Feb. 1). What is most sobering is that people who, no doubt, want the best for young children would choose to use the Oregon kindergarten assessment.

The article describes results from an evaluation of last year's entering kindergarten students. The assessment included observation of students' behavioral preparedness, together with a test of reading and math skills. And while research shows that a child's behavior is a better indicator of future school success than academic skills, the article leads with statistical results of the skills test. It implies that the children assessed have been shown to be ill-prepared and that preschool education is deficient. The article misses the point: It is the assessment itself that is deeply flawed. It measures the wrong things, with the wrong instrument, in the wrong way.

**The wrong things:** The assessment is not consistent with accepted views of appropriate preschool curriculum. The Head Start Child Development and Early Learning Framework and the Common Core State Standards (both adopted by the state of Oregon) include literacy and math skills that are generally agreed on as important indicators of school readiness. These include: book skills, print awareness, story comprehension, interest in books, understanding that writing is a way to communicate ideas, ability to associate quantities and the names of numbers with written numerals, ability to count to tell the number of objects and the ability to compare numbers. These are things that good preschools strive to teach, but none of them is addressed in the kindergarten assessment. Instead, it asks 4-year-olds to



BRUCE ELY/THE OREGONIAN/2012

demonstrate that they can recognize uppercase and lowercase letters out of meaningful context and do paper and pencil math computation. Phonics and math should certainly be taught in preschools – but in meaningful and appropriate ways.

**The wrong instrument:** The easyCBM test was used for the reading and math skills assessment. Curriculum-based measures, or CBMs, are standardized assessments designed to help teachers evaluate the effectiveness of instruction. Tests should be used only for their intended purpose. An achievement test should never be used to assess readiness.

**The wrong way:** It is well-known that young children are not good test takers. Subjecting 5-year-olds to a timed test is not only hopeless from a practical standpoint, but it can subject children to undue stress. A child just entering kindergarten – particularly a child who does not come from a family that reads to him or her every day or who has not attended a high-

quality preschool – should not be subjected to this type of experience.

Since last April, I and a group of early childhood experts have been communicating our concerns about this assessment to Jada Ruple, Oregon's early learning system director, and to the Early Learning Council. The issues we raised have been ignored, and the assessment has been administered in spite of its flaws.

Policymakers in Oregon, who have young children's best interests at heart, would do well to find an approach to assessing readiness that is consistent with what we know about young children's development and learning and that will truly help children enter kindergarten ready to succeed.

*Stephanie Feeny is professor emerita of education at the University of Hawaii and adjunct faculty at the Graduate School of Education at Portland State University.*

**Share your opinion Letters:** Please limit to 150 words and submit to [letters@oregonian.com](mailto:letters@oregonian.com). **Commentaries:** Please limit to 500 words and submit to [commentary@oregonian.com](mailto:commentary@oregonian.com). Include your home address and phone number for verification. Submissions may also be faxed to 503-294-4193; or mailed to Oregonian Opinion, 1320 S.W. Broadway, Portland, OR 97201. All submissions become the property of *The Oregonian* and will not be returned. Submissions may be edited and may be published or otherwise used in any medium. Reach letters editor **Nora Simon** at 503-221-8461 or [nsimon@oregonian.com](mailto:nsimon@oregonian.com).

Oregonian

Feb. 7, 2014

## Kindergarten testing

Stephanie Feeney laid out many of the reasons that the statewide kindergarten readiness assessment is an inappropriate test for incoming kindergartners ("Oregon's test is wrong, not the children," Feb. 7).

One effect of such a terrible assessment is that teachers simply do not get the information they need about each kindergartner. This year, my fellow kindergarten teachers and I spent much of September taking kids aside to fill in the gaps of what students knew and did not know. With 26 students who needed to learn the norms of learning and behaving in a classroom setting, this was time that we did not have.

I strongly urge the Early Learning Council and the Oregon Department of Education to revise the test to be both developmentally appropriate and helpful to teachers or, better yet, to pull the plug on the kindergarten readiness assessment.

**RICHARD MELLING**

Southeast Portland

*Melling is a kindergarten teacher at Chapman School.*

Stephanie Feeney is right on in her criticism of the kindergarten readiness testing.

My wife is a veteran learning specialist who accurately points out that the biggest indicator of kindergarten readiness is often the child's ability to sit, pay attention and learn.

The elementary curriculum begins in kindergarten. If children are ready to receive and it is delivered competently, they can succeed.

**PATRICK GABRISH**

Milwaukie

Oregon's children appear to arrive at kindergarten not knowing letters, letter sounds or how to complete simple math problems ("Kindergarten test results 'sobering,'" Feb. 1). Given serious issues with the assessment's administration and interpretation, the results are not surprising.

The assessment is developmentally inappropriate,

expecting young children to perform on timed tasks with unfamiliar adults. The test is culturally inappropriate, assessing most children in English, regardless of primary language.

The interpretation is inappropriate. Jada Rupley, Oregon's early learning system director, states, "We would hope they would know most of their letters." However, Oregon's standards for preschool (Head Start) and kindergarten (Common Core) specify that children become familiar with the alphabet by the end of preschool and know the entire alphabet by the end of kindergarten.

Finally, the report overlooks "approaches to learning" – skills that help children productively participate in classrooms – where scores are above the midline.

Let's focus on preparing schools to work with young children, rather than applying deficit interpretations to results of seriously flawed tests.

**CHRISTYN DUNDORF**

Northeast Portland

**JILL O'DONNELL**

Klamath Falls

**MARY-MARGARET STOCKERT**

Coos Bay

*Dundorf is faculty department chair for Early Education and Family Studies at Portland Community College. O'Donnell is a retired kindergarten teacher. Stockert is a kindergarten teacher. They write on behalf of the Oregon Association for the Education of Young Children Governing Council.*

It pained and embarrassed me to read that our children are expected to know all letter names and sounds *before* kindergarten. I am pained because of the undue stress the test places on children, and embarrassed because Oregon was once a national leader in progressive policies that support the holistic development of young children.

This test rewards rote memorization, a lower-order thinking skill, while neglecting higher-order literacy skills such as understanding text. The reading and writing readiness of our children can be more accurately determined by asking them to "read" a familiar book and to write their name. Valid and reliable assessments of these simple, low-stress tasks exist and would provide more useful data for Oregon educators and policymakers.

What was expected of first-graders 30 years ago is now expected of preschoolers. Children have not changed; we just unnecessarily keep putting more pressure on them.

**STEFFEN SAIFER**

Southwest Portland

*Saifer, owner and president of Saifer Educational Consulting, is an international consultant to early childhood education and development programs.*