ADAPTATION

A PUBLICATION OF THE NEW YORK BIOLOGY TEACHERS ASSOCIATION

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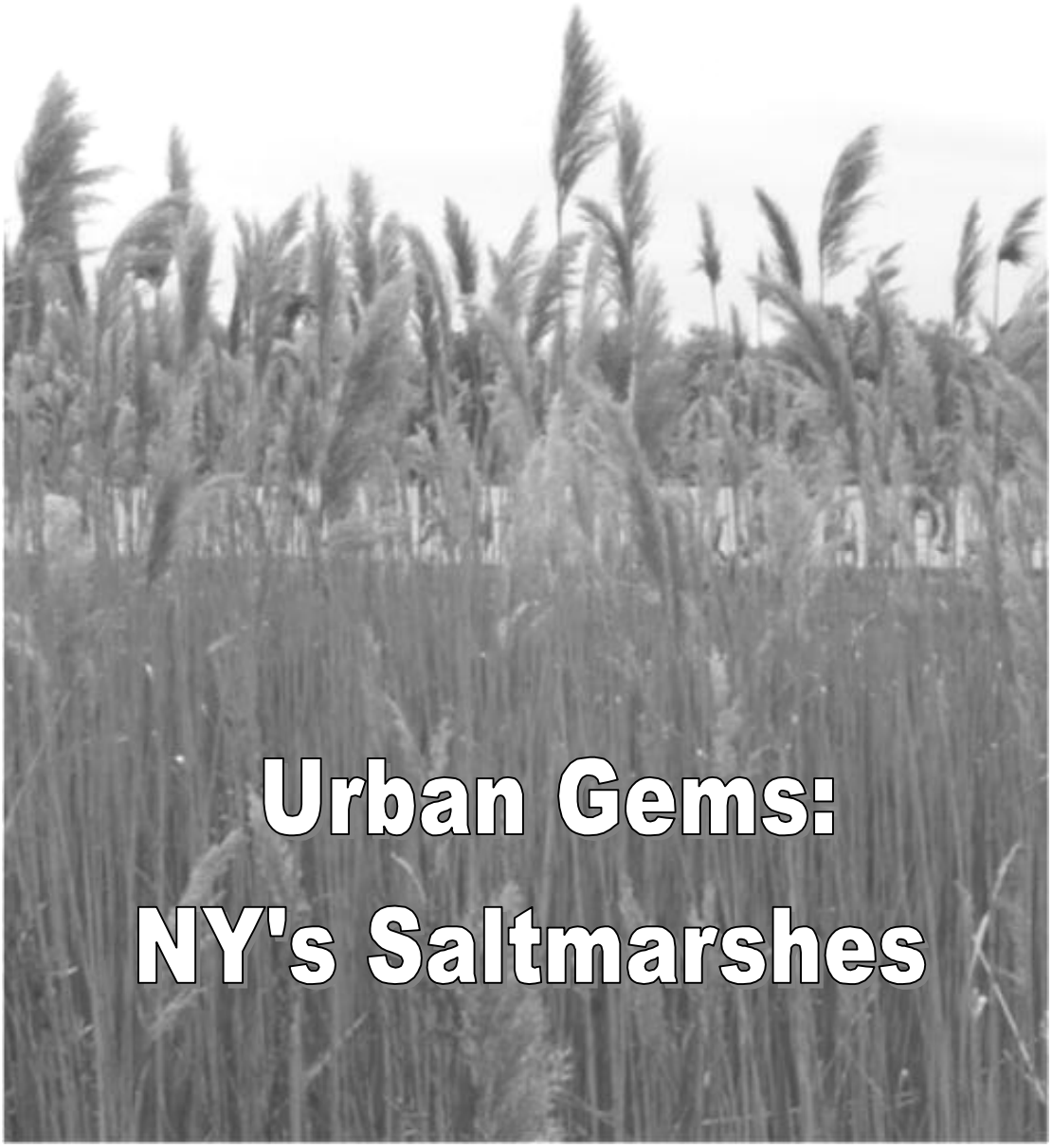

Urban Gems: NY's Saltmarshes

MEMBERSHIP RENEWAL ISSUE

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NYBTA PROFILE

The **NEW YORK BIOLOGY TEACHERS ASSOCIATION** is a non-profit organization of professional biology and science educators in New York City and the metropolitan area. Founded in 1899, the Association is an affiliate of the **National Association of Biology Teachers (NABT)**, and a member organization of the **Science Council of New York City (SCONYC).**

Through its programs and activities, NYBTA assists in the professional growth of those Biology teachers, who are working in our school systems, and provides a climate in which biology teachers can enjoy "doing science". Through publications and mailings, the organization hopes to voice the concerns of science educators in and around the city. NYBTA gives its membership opportunities to meet each other and share thoughts and ideas relative to all biology educators.

Some of the special services and programs of the Association are the following: **Executive Board; Monthly Meetings; Special Events**; **Annual Techniques Meeting; Otto Burgdorf Student Science Conference and Competition;** and the **Annual Awards Social**.

Representatives of NYBTA meet with their counterparts from the National Association of Biology Teachers, National Science Teachers Association, and the Science Teachers Association of New York State. In addition, as a member of the Science Council of New York City, NYBTA plays a major role in the city-wide science efforts that include the annual **SCONYC CONFERENCE** attended by hundreds of science teachers.

NYBTA is an organization that is different, educational, meaningful, and active. The New York Biology Teachers Association offers its members activities beyond their school, opportunities to exercise their creativity, and occasions to share and develop their expertise.

STATEMENT OF IDENTIFICATION
ADAPTATION is the publication of the New York Biology Teachers Association, PO Box 360192, Brooklyn, New York 11236

This year's annual national conference for the National Association of Biology Teachers is to be held in Portland, Oregon from Wednesday, Oct. 8 to Saturday, Oct. 11. This a great opportunity to visit a beautiful city and see one of the most scenic coastlines of North America. Besides, there are many outstanding scheduled events, attractions, workshops, and seminars; field trips are planned for Mt. St. Helen, wineries, Jackson Bottom Wetland, Multnomah Falls, the Bonneville Dam, and a tour of the Oregon coastline.

Generally, between ten and twenty colleagues from Long Island, NYC, and upstate New York, representing various biological organizations, at all teaching levels, from the very experienced to the newcomer attend the NABT conference each year. If you are interested in attending or learning more about the conference contact me by either Email oceansciprof@aol.com or call (516) 572-7065

In 1987 , I attended my first NABT Convention in Cincinnati. I was surprised to find how much change occurred since that visit. Cincinnati is a gem nestled on the banks of the meandering Ohio River. This city has amenities that you would expect to find in a large city of America, yet it retains
the friendly character of large hometown.

Last year's 2002 NABT conference provided a wide variety of workshops, activities, field trips, and speakers. Whether you teach elementary, middle, high school, or at a two year or four year college, you found many topics that met your needs as a life science educator.

It was great to see old friends, catch up and meet and meet newcomers to the conference at the welcome reception, Wednesday evening. Wondering through the hall, I viewed the latest science programs, technologies, equipment, textbooks, and lab manuals. The visit to the Cincinnati Zoo was outstanding. I wrapped up my stay at the Annual Banquet Saturday Night with Thomas Lovejoy, one of the world's leading environmental problem-solvers and ecological scientists.

The opposable thumb, its owner on the run in a Pliocene savannah, grabs at a ripe fruit from a passing low branch, as bipedal primates with binocular vision stare anxiously out over the tall grass, looking for ripples.

The watertight egg nestles patiently in the dry sand on a sunny Cretaceous afternoon, far from the dreadful, hungry swampland below.

Two new sets of 12-inch transparent wings glisten, fluttering in Permian whispers among the reeds by a silent riverside.

These examples are multiplied by the millions in our evolving world. *Adaptation*, the moniker for our journal permeates our craft. The biology teacher who has a handle on the happy accidents of structure and function that nature fashions for us can use them to introduce students to the wiles of natural selection. Depending on the level of instruction and the motivation of one's pupils, the simple algebra of Doctors Hardy and Weinberg can even unite the phenomenon with numbers.

Most youngsters do an initial intellectual double-take on Darwin's legacy, but by the time they meet up with Lamark and are convinced to cast off the cloak of animal intent and need for change over time, the simple beauty of the idea of accident-dependent modification becomes more acceptable.

The fossils are spread on the table and cladograms collect on the board. Mutation's blind role in extinction and success begins to emerge from the academic fog by the time the unit on genetics and molecular biology are over. Somewhere near the middle of June, most of us wish we had just a little more time to linger here in serendipity's garden.

Each September we resume our courses of instruction, content that life crawls, wiggles and soars over the earth under a hail of mutagenic particles of such homogeneity that we can tell geological time by it. It is with some confidence that within the coming months, we assume that the latest batch of children in our care will internalize the regimen of

1. overpopulation,
2. variation driven by unpredictable changes in DNA,
3. competition for mates and resources, and
4. pruning of populations in favor of the lucky members whose traits permit them to face new and relentless selective environmental pressures.

Meanwhile, back at the research lab, bacteria are practicing heresy. In 1989, to researcher Thomas Cebula, they appeared to be mutating adaptively, when presented with stress. In search for a fast-mutating group of "outbreak" pathogens, he and his colleagues treated many of them with antibiotics and screened for strains that developed resistance faster than others. They found nearly 6% in some strains, instead of the usual 0.1% expected (Remember: most mutations are bad, right?).

These "mutators" all lack the ability to repair DNA mismatches both during replication and during that nasty habit that

bacteria have of incorporating nucleotide sequences from other bacteria. New we have pathogens that can alter their own genes rapidly and absorb changes from their neighbors more easily. Fortunately for us, even though these organisms win the variation race under pressure, their frequency drops when not under the strain of immune and drug attack. Cebula's guess was that there are some groups of mutators that keep their abilities in reserve until they come under stress.

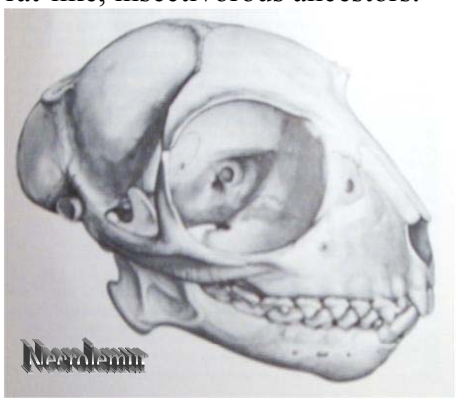
In 1995, Radicella, Park and Fox noted that under conditions of starvation, certain *E coli* accumulated mutations some of which permitted them to exhibit resistance to antibiotics on their Petri plates. They narrowed the DNA change to a reversion of a *lac* allele that depended on conjugation to work. In the same year, Galitski and Roth showed that the passing of plasmid DNA (not chromosomal DNA) in bacteria was essential for the appearance of "adaptive mutations" under starvation stress (selective media).

Are environmental conditions "directing" mutations to adapt to them? In the absence of hard data on the protein signaling involved in gene reversion during plasmid replication, the jury is still out. Molecular biologists have been watching many cell complexes that reorganize DNA sequence information and have targeted them as major agents of genetic change. The ability to chemically support mutations while under stress adds a new twist to our strictly Darwinian paradigm.

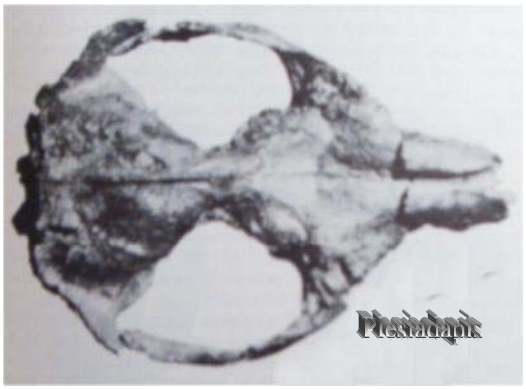
The first sigh of relief carries with it some level of thankfulness that it is confined to those tiny Monerans, but the plot thickens.

All primate genomes are peppered with sequences called ALU's that have an ancient history of copying themselves and moving around the chromosomes. In fact, in most cases, these comprise nearly 10 percent of our genomes, from lemurs to hominids. Most of them are traceable – if you know your bioinformatics – to the time of proliferation of the mammals, just after an errant asteroid blasted reptilian control of the surface to smithereens.

Are these ALU's (that fall into the class of molecules known as transposons) molecular fossils from a time when some inefficient parasite invaded our multi-cellular existence, offering us new combinations of DNA sequences, when we needed them the most? This was a time when niches by the millions opened up for colonization by our little rat-like, insectivorous ancestors.



Did these virus-like parasitic genomes make extinct creatures like *Necrolemur(Eocene)* and *Plesiadapis* (Paleocene) natural genetic engineers, able to face new environments more effectively, with new "tool-boxes" of recombinatory molecules roaming their genomes? This fits the definition of adaptive mutation rather nicely.



The more we know about the molecular family of self-replicating, protein-

making nucleic acids, the more complicated the definition of "adaptation" becomes. Furthermore, adaptation is not the only player in the evolution game. In a letter to *SCIENCE* magazine, in July of 1995, scientists Lenski and Sniegowski eloquently reminded their colleagues that "Modern evolutionary theory is much more than adaptation by natural selection, as it also recognizes the possible roles of random genetic drift, pleiotropy, and various structural constraints in explaining the derivation of traits."

Lamark is not rising from the dead. Vitalism, the bane of Redi and Spallanzani, has not returned to howl us back into creationism. Hard, methodical science has simply opened more doors of inquiry into the mechanisms of change in living organisms over time. Mutation, as a black-box process within evolving systems, is revealing itself as a process that is multiple in form and function: Single point changes in nucleotide sequences, resulting from the action of mutagens such as ultraviolet radiation, or the ballistics of subatomic particles from below us and above, cannot account for the variety of forms or the differences in tempo and mode in evolution.

Every month, new enzyme functions for endonucleases, ligases, recombinases, and topoisomerases are emerging in the literature. Retrotransposons, viruses and plasmids each bring their own sets of rules and limitations into the DNA replication, repair and control processes that have been operating during life's watch on our planet.

Whatever the reasons or mechanisms involved, it is becoming increasingly apparent that stress-induced mutations participate in adaptive evolution, and that these actions involve the absence or interruption of repair processes in the cell. In a paper published this year, workers Bjedov et al summarized the semantics of it all with the conclusion "when adaptation is limited by the supply of mutations, selection was shown to favor strains having constitutively increased mutation rates."

Within the past several years, scientists like Dr. Susan Rosenberg have taken note that the models being generated by research into adaptive mutation are useful in understanding the development of the immune system and the cell changes that lead to cancer. They all involve molecular mechanisms of genetic and genomic change and repair, and the successful proliferation of cells. At very least, inquiry into the adaptive quality of mutations is leading humanity in the direction of possibly controlling our own evolution through the management of disease and resistance.

In her book, "Darwin in the Genome," Lynn Caporale outlines mutation "strategies" that all increase species' chances for survival based on the simple fact of increased variability. With every new organism's genome sequenced in labs around the world, increasing evidence points to a history of successful patterns of change clustered on its chromosomes – relic "fingerprints" of genes and pieces of genes that participated in widening the available range and number of potential molecules for interfacing a changing, stressful world.

Finally, what is actually doing the evolving? "Selfish" genes? Species under the "blind" guidance of random change? Ecosystems, in a symphony of competitive mutational strategies? Or is the elusive process of evolution as we see it merely a glimpse into competing diversities?

How many of us will be stopped dead in our instructional tracks this year by students with penetrating questions about evolution that can be approached by teachers with a less simplistic view on the topic?

Type "Adaptive Mutation" into a computer's search engines and see what pops up next month on your browser. Don't be surprised if what you see increases your fitness as an educator.

TOP 10 REASONS

WHY YOU SHOULD BELONG TO NYBTA

1 DISCOVER Magazine for $8.00

For those who join or renew by November 30, 2003

2 Student Science Research Competition

3 No Charge For NYBTA Events

4 ADAPTATION Magazine

5 Creative Lesson Ideas

6 Exciting Field Trips

7 Socialize With Colleagues

8 Discount Admission To SCONYC Conference

9 Alerts For Upcoming Events

10 Dues Still Onlv $20

ENDANGERED SUBJECT: ELEMENTARY SCIENCE EDUCATION

By Barry Weinbrom

Unless we reverse the downward direction that elementary science education is heading, we will not be able to prevent the extinction of this most important learning experience. The former National Science Teacher Association President JoAnne Vasquez, a featured speaker at this year's NSTA Convention in Philadelphia said, "we are displacing science with a push toward learning reading, writing, and arithmetic," "we have to be able to educate the whole child and she believes that integrated science instruction is the key to America's future. "We need to bring high quality science education to elementary youngsters before it is too late," says Barry Weinbrom, a 35 year classroom science teacher in middle and high schools who retired in 2002. Mr. Weinbrom,

presently the Director of ASAP, After School Activity Programs is taking the initiative by creating SCIENCE: **S**cience **C**ommunity **I**nvolvement in an **E**ducational **N**etwork for **C**hildren's **E**nrichment.

The 8-week hour and a half weekly program, Hands on Science Outreach (HOSO) is designed to stimulate "science in your life" awareness. This year students (Pre K, K-1, grades 2-3&4-6) will explore, experiment, play games, sing and construct age appropriate projects in Anatomy in the fall, Chemistry in the winter and Earth Science in the spring. A maximum of 11 students are enrolled in each class.

The fall Anatomy theme is attracting a number of science practitioners from the community to get involved with their local schools. Dentists, veterinarians, chiropractors, podiatrists are teaming up to provide not only scholarships but also support. They have become **SCIENCE** members:
Science **C**ommunity **I**nvolvement in an **E**ducational **N**etwork for **C**hildren's **E**nrichment

<u>SCIENCE:</u>

*Gets elementary age children excited about science.

*Will develop the important skills of observating, thinking, reasoning hypothesizing and problem solving.

*Children learn that they are scientists.

*Children communicate about their science enrichment experience with family or friends.

*Children will continue to be, or become, confident to do more science activities.

*Gives community members an opportunity to show support fo science in schools.

*Builds teams between, parents, community, students and teachers.

*Helps science practitioners become involved with their local educational community.

*Brings schools into the community and the community into the schools.

ASAP would love to bring the SCIENCE program into your school and science community. The timing is right for the parents and community to come together and become advocates for science education. We can accomplish this with SCIENCE. Set up a SCIENCE Program in your school, ASAP. We offer a variety of exciting science programs for youngsters in pre-K through grade 12 that get youngsters to develop a passion for science and the environment. Call ASAP to become a member.

Barry Weinbrom
718-965-9814
email: baw441@aol.com

THESE MEMBERS ARE CONSTRUCTING A CONCEPT MAP AT THE 1/25/03

LIVING ENVIRONMENT STANDARDS WORKSHOP.

WERE YOU THERE? *DON'T MISS THE NEXT ONE*, IF YOU WANT TO SHARE IDEAS WITH COLLEAGUES, PICK UP SOME HINTS AND PRACTICE MANDATORY LABS BEFORE THEY APPEAR ON YOUR TABLE.

It's About Time: A Truly Integrated Approach to Biology and Chemistry for High School

Most natural phenomena cannot be described within a contained "subject area." Scientists utilize cross-cutting physical, chemical and biological concepts to demystify the processes that nature employs. If neither nature nor science lives within single subject area boundaries, why is science education still compartmentalized with each year of stu ?

No one we know has been able to provide an educationally sound answer to that question. That is why we are developing *The Investigations in Biology and Chemistry Program* (Bio-Chem I & II). An initiative of EduChange, Inc., this Program offers a comprehensive, fully integrated, two-year science experience for secondary students. The Program is based on the premise that teaching, learning and science are commonly grounded in the process of inquiry. It is currently being piloted at The NYC Upper Lab School in Grades 9-10, and Millennium/TriBeCa High School in Grade 9, receiving support from The Dorr Foundation and The Fund for Teachers. Three additional pilot schools will be joining the group in 2003-2004. EduChange® provides educators with an extensively resourced curriculum: teacher support materials and accompanying rationales, lesson plans, laboratory activities, formative and summative assessments, long-term rubrics, and student handouts to support every classroom period for two entire years.

EduChange, Inc., The Rockefeller University, and Teachers College, Columbia University are currently collaborating to further develop, test, conduct research on, evaluate, and ultimately disseminate Bio-Chem I & II. **We are seeking interest from additional NY schools (public or independent) for the 2004-2005 school year**. These schools must be willing to support teachers in a highly rigorous immersion in best-practice teaching and integrated science content. We welcome educators, students and administrators to join our inquiring community.

To learn more about this opportunity, please contact Catherine Rubin at Catherine@educhange.com or 646-613-8877. You are invited to peruse our web site at www.educhange.com for further information about our organization.

FROM A SISTER ASSOCIATION: THE MASSACHUSSETTS ASSOCIATION OF BIOLOGY TEACHERS

Courtesy of Paul King

Biology Simulations
From: Larry Flammer
flammer2@PACBELL.NET via the
Secondary Biology Teacher Enhancement PI
BIOPIL@LISTSERV.KSU.EDU:

ONLINE AND CD INTERACTIVES FOR BIOLOGY
Virtual Age Dating
Understanding Geological Time (both in the Geol./Paleo Patterns section at):
http://www.indiana.edu/~ensiweb/evol.fs.html

Chaos & Order (prep. and source for Evolution in Motion simulation, and the Chaos Game, both on same CD):
http://www.indiana.edu/~ensiweb/lessons/chaos.html

Whale Evolution Kiosk:
http://www.indiana.edu/~ensiweb/lessons/wh.kiosk.html

Bio-animations: HHMI's Interactive (Howard Huges Medical Institute)
http://www.biointeractive.org/
Evolution of the Y Chromosome
Meiosis and fertilization

DNA/Genetics simulations, available from the CSH site:
http://www.dnalc.org/

BIOINFORMATICS LESSONS ON ENSIWEB:
Tutorial: Investigating Evolutionary Questions Using Online Molecular Databases:
http://www.indiana.edu/~ensiweb/lessons/p.tut.db.html
Pseudogene Suite (3 lessons): Vit. C and **Common Ancestry:**
http://www.indiana.edu/~ensiweb/lessons/psa.ball.html

BECOMING HUMAN: Learning Center (Human Evolution)

Simulations and Lesson Plans:
http://www.becominghuman.org/

UCMP Exploration Through Time
(interactive modules)
http://www.ucmp.berkeley.edu/education/explotime.html

Simulated Research:
BGUILE Project, downloadable software, MS, HS

Galapagos Finches: Investigating Natural Selection
http://www.letus.org/bguile/finches/GalapagosFinches_software.html

Florida Panthers Investigation (evoluution and conservatin biology)
http://www.letus.org/bguile/panther/FLoridaPanthers_software.html

Also, **TB Lab** (antibiotic-resistant bacteria lab simulation) and **Landlord** (a behavior studies module, how to ask good research questions
and discriminate between observations and interpretations).
MUSE: Modeling for Understanding in Science Education
http://www.wcer.wisc.edu/ncisla/muse/index.html
(navigate to Natural Selection section, then to student materials...)
Biology Labs On-Line (requires purchase) for college and AP HS bio
http://www.biologylab.awlonline.com/
Virtual Courseware for Earth and Environmental Sciences (links)
http://vcourseware5.calstatela.edu/
Virtual Frog Dissection
http://www.froguts.com/
The Biology Project: online interactive resource for learning biology
http://www.biology.arizona.edu/

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781-784-2195

LIVING ENVIRONMENT WORKSHOP

GET THE LATEST INFORMATION FROM NYS MENTORS

NOVEMBER, 2003

SEATING IS LIMITED
PREFERENCE WILL BE GIVEN TO NYBTA MEMBERS

WATCH FOR DETAILS IN YOUR OCTOBER MAILING AND AT WWW.NYBTA.ORG/EVENTS.HTM

BIO-BLITZ

By Allen and Sarah Rolnick

There is a lot more to Central Park than pigeons and squirrels.

The day was warm and sunny on Friday, June 27 when NYBTA members, members of the Explorers Club, and members of other conservation and wildlife organizations joined together for BioBlitz. BioBlitz was a 24 hour event, beginning at noon on Friday and ending at noon on Saturday, during which participants searched the 843 acres of Central Park to discover and record the range of species that can be found there. As 150 year-old Central Park is not a natural ecosystem; most species have come from elsewhere. BioBlitz was the first attempt to catalogue its biodiversity.

The Explorers Club provided BioBlitz tee shirts, snacks, and bottles of water to participants. Microsoft provided computers for on-site recording of data. It was very encouraging to see so many volunteers that day, not just scientists and teachers. There was even 'biodiversity' among the BioBlitz participants: young & old, professionals & amateurs, families & school groups, celebrities & ordinary folks.

NYBTA members joined with members of the American Museum of Natural History. Some of us went along with the ichthyology group and used various kinds of nets to attempt to catch slithery, fishy things in several Central Park ponds. In addition to fish, our group also caught some turtles which we turned over to the herpetology group.
D
Sylvia Earle, Time Magazine's 1998 'Hero for the Planet' donned scuba gear to seek organisms in the depths of the lake, I donned rubber boots and netted specimens at the Turtle Pond. Photos of Ms Earle in the lake and me at the Turtle Pond accompanied the NY Newsday article about the event (6/28/03 p. A8). Numerous other BioBlitz participants had nets, microscopes, binoculars, brushes, or other collecting and observing tools to assist in the effort to amass samples and data. The rubber boots that I wore turned out to be pretty good. Not only did they keep water out, but after I fell into the Turtle Pond, they kept water in. As the weather was warm into the night, going home sans socks was no problem.

Staff members of the American Museum of Natural History were on hand to help participants and to identify specimens as were staffers from the New York State Museum in Albany. Of particular note was a 50 pound snapping turtle found in, of all places, Turtle Pond.

Nighttime security was provided as nocturnal investigators searched for owls, bats, moths, and other creatures of the night. All in all, bark was brushed, depths dived, rocks overturned, bushes searched, and the sky scanned. A link to the list of organisms identified is at www.nybta.org/special.htm

"Too many teachers come to the classroom to teach about the living environment with limited or no hands-on experiences in the environment," said NYBTA president Jennifer McHugh. "Books have replaced field experience. I am pleased that NYBTA has been able to provide teachers with experiences such as this. We have had several field trips this past year and have already scheduled more for the 2003-4 year."

NYBTA members came home with stories to tell their students about this exciting day in the park.

Later that night we watched the T.V. news to see if there were any shots of us or of others that we knew. We did see the tank with the fish that I had netted, it was exciting, but we only knew them briefly

DO YOU HAVE NEWTS IN YOUR BIOLOGY CLASS? FIREBELLIES ARE FUN! PICK A FEW OF US UP AT THE PET SHOP AND ADD SOME ELODEA SPRIGS. WE LAY EGGS ON THEM.

On July 31st of this year, my son John & I had the pleasure of driving up to the wire-and-stick gate of Dr. Bill Rember, an Idaho geologist. We had traveled over three thousand miles in the family van, after visiting the "Fossil Bowl" web page and following the links to an invitation to dig 12 million year old leaf fossils out of a slope cut in his back yard.

"The place looks boarded up, Dad" was John's impression of the house at the end of the directions we had downloaded back in Brooklyn. We left a hand written note that we'd be back as scheduled, tomorrow. We then drove about 70 miles south to the town of Moscow, where we negotiated one of the last rooms in a motel there, fast filling up with families that had been chased from there homes by a forest fire some miles to the west.

Dr. Rember was waiting for usthe next morning, upset that he had not got home in time from the University to offer us a room himself. He took us on a tour of several cuts and holes he had dug, while securing the property from local mining and lumber interests, and described his strata correlation.

A four-foot wide, seventeen-foot deep tunnel about thirty yards from the cut we were to work had verified his assumptions about the dip and strike of a this portion of a late tertiary lake bottom he had been working since getting his doctorate. The hole was all the more impressive, considering that he is in his sixties.

Using a slane-like tool that a friend had fabricated for him, he cut several slices of the darker strata of a stepwise provenance he

Dr. Bill Rember

established near the house and suggested that we join him in a demonstration of fossil extraction. Using a pen-knife, he split the taffy-like block, exposing the perfectly preserved leaves of an ancient birch, a pine tree named *cunninghamia* (!) and another portion of a tulip-tree leaf. Asking us to stand up-wind of him, he carefully poured several drops of hydrofluoric acid on the fossils, and then dipped them gently into a bath of cool mountain water.

"Do you have any working hoods in Brooklyn Tech?" he asked, as the leaves simply floated free of the matrix. He scooped each of them up with a piece of window screen and transferred them to one of the pieces of overhead transparency plastic I was cutting. I couldn't believe my eyes. He fixed the fossils between transparencies, with several drops of glycerin to keep them moist, and held them up to the hot noon-day sun:

"Can you see the leaf galls and the places where insects and fungi worked on the leaf before it was covered by lake silt?" Bill's property contains several hundred acres of world-class paleo-vegetal matter from the Miocene, and he's not selfish about it. "If you think that you can assemble a field trip of teachers interested in ways to use geology to excite their students, they're welcome here." In the ensuing hours, John and I recovered nearly a hundred pounds of material loaded with leaves and stems from the cut near Bills house.

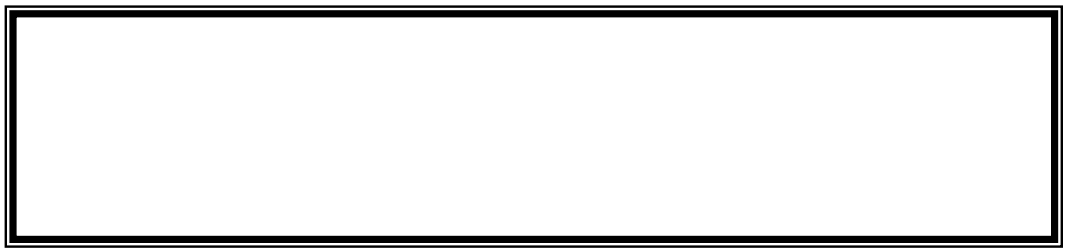
Hands shaking from hard work in the 100 degree mountain air, we all sat down and shared stories in his kitchen. He is still working on the housed - hence the boards - and intends to have a shop/lab built into the cool side of the hill we were working that afternoon. I pulled out the laptop and showed him photos of the vegetal matter of the same age that I had recovered from the limestone cliffs on the Greek island of Euboea, several years prior. "Looks like the shore near a Miocene Beech forest," he said, squinting at the gel screen.

He offered to take us to the crest of Bechtel Mountain, nearby, in order to see the entire extent of the old lake bottom. We passed old and recent clear-cuts in the pine forest that had been replanted soon after by the Potlatch lumber company on our ascent.

Each section of arboreal monoculture was flourishing, while wide sections of the old "natural" forest around us had been subject to devastating wild-fires over the decades. The delicate balance between biodiversity, human management and natures way is still being fought here. Poor science and corporate greed still play havoc with the lives and communities of families that depend on the forest for their livelihood. The sight of local logging camps, towns in poverty and the open, friendly faces we'd met on the way combined with the vision of chunks of charcoal in the sediments we dug that afternoon to remind us that the fight for natural balance and freedom to thrive is still in full swing.

(Fossil Beech Leaf)

While sitting on Precambrian sediments covered with red crystals, we shot the cool mountain breeze, and realized how much teaching technique and general wonder about the earth and its life we share. Despite the sense that we were to drive back to New York with an eye-popping box of Neogene jewels, it didn't take much thinking to know what the real treasure is, here: A teacher who teaches by sharing knowledge through fascination.



Below are excerpts from e-mails sent by former NYBTA presidents Allen & Sarah Rolnick while on their most recent oddessy. For a more complete set of e-mails, please make a request to NYBTAprograms@hotmail.com

Colorado River
January, 2002

Hi!

Nothing much happening. We're veg-ing-out beside the Colorado River just south of Lake Havasu. Lake Havasu City [home of the London Bridge since 1971] has grown exponentially since we were first here about 25 years ago. The factor behind the great growth was McCulloch, of the chain-saw company, who bought property along the lake, created in 1938 to supply water to Southern California. Mr.. McCulloch had the idea to bring the London Bridge here and it is now Arizona's second most popular tourist attraction [after the Grand Canyon]. Tens of thousands of people now live in this part of the western Arizona desert, adjacent to California.

It is sunny and warm daily. It doesn't rain. There is so little to do here but the county park campground has 50 channel cable. We can watch "Law & Order" all night.

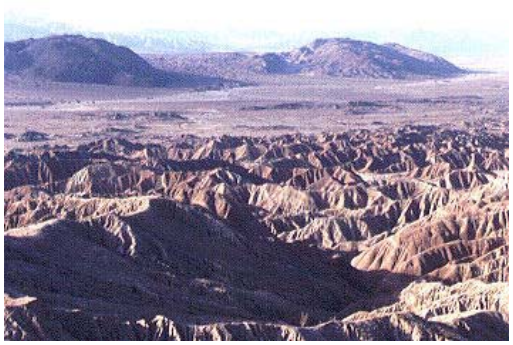
Of course, the river is available for water sports and we are across the road from Emerald Canyon, a lush green golf course in the barren wastes. There is a weekly swap-meet where money is exchanged for goods. For excitement, $1.00 buys a round trip bus to Laughlin, Nevada for gaming. [Buffet lunch included.] We are only about 6 miles from the Colorado Indian Tribe's casino.

We're in town [Parker] because we ran out of groceries. We also took the time to do laundry and go to the library.

In Las Vegas, since Sept. 11, for security reasons, the library requires a photo ID and records the information in their computer along with the number of the computer that one is using. In nearby Lake Havasu City and Parker, no ID is necessary. Names are asked only for timing purposes. It was interesting to note that at the time we were providing NYS Driver Licenses to the Las Vegas library, the Las Vegas police found hundreds of phony photo IDs [including driver licenses] for sale in a store a few blocks from the library. So much for security! Their security is only for honest people

San Diego, CA
February, 2002

After soaking in the hot mineral springs of the Palm Springs area for two weeks, we looked like stewed prunes. We spent several days in Anza-Borrego Desert State Park to dry out. http://www.anzaborrego.statepark.org http://theabf.org in dispersed camping [out in the wilderness without water, electric hook-ups or sanitary facilities {we have our own, of course}]. The last time we were here, there was a $10/3 day fee. This year the fee was eliminated. We lucked out and saw a small herd of the big horn sheep that the park is named for (borrego=sheep.)


The Anza Borrego Desert

San Francisco, CA
April, 2002

We took a day to drive down to Big Sur visiting Point Lobos State Reserve, Pigeon Point Lighthouse, and seeing sea otters, seals, and sea lions as well as the scenery of California's middle coast.

The hills of San Francisco took its toll on our driving by reducing our gas milage to 7.5 mph and probably wore the brakes down some.

Fisherman's Wharf was interesting. From there we visited the Hyde Street Pier and Alcatraz, both operated by the National Parks Service. The former has historic ships to tour, the other was a prison which held a lot of really bad
guys.
Being a port city, San Francisco has a lot of good and varied restaurants. We had a brief time after the holiday to try some out with the family, and, of course, a visit to several of Napa Valley's wineries and took the Jelly Belly factory tour.

Klamath Falls, OR
April, 2002

We continued along the coast into Oregon and turned inland to visit Crater Lake National Park. We were surprised to find ten feet of snow still on the ground. Driving through the park is like driving through a narrow white-walled canyon. Only the road to the rim parking lot is open. The north entrance doesn't open until mid May and the campground doesn't open until late June.

The rim road around the lake [elevation 6,000+'] is not cleared of snow until early July and is not open at this time. In order to see the lake, one enters an eight foot diameter steel tube that pierces the snow bank from the road [which is plowed daily] to the edge of the steep slope into the crater. There is a door on one end of the tube and a window on the other.

We woke this morning to find several inched of wet snow on the ground. We would have stayed in the campground [where we have electric and 50 channels of cable T.V.], but we had an appointment in town for van repairs. This caps a week of repairs [thermostat
(Coos Bay), catalytic converter Eugene), and radiator (Klamath Falls), all in Oregon which has no sales tax; at least a little savings.

We've seen many elk on this leg of the trip [Roosevelt Elk in the redwoods and Tule Elk in our current campground). We've also seen more seals and sea lions along the coast. In one place, we saw a
mixed colony of both seals and sea lions which included many pups.

We are in a lull on the whale migration route from the Baja to Alaska. Mid-March is the migration peak of the males and solitary females; May-June is the peak for nursing females and their calves. Peak means about 15 whale sightings per hour. We'll try to get back to the coast for that.

For the time being, we plan to hang around in the southern Oregon-northern California area until it warms up some more north of here. One surprise snowfall was enough!

Our next planned stop is Lava Beds National Monument in northern
California which is about 30 miles from here.

There are numerous lava tube caves there which we plan to explore. Sarah has been hesitant to go into caves. She says that she is uncomfortable about having creepy things touch her in the dark.

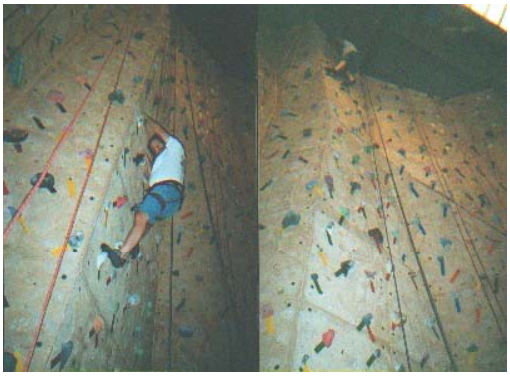
Oroville, CA
May, 2002

We'd been in Klamath Falls before. I was disappointed to learn of the closing of the Royal Fork Buffet, an establishment which provided me with much food on past visits. I soothed my disappointment with a visit to Red's Backwoods BBQ's
all-you-can-eat beef ribs and put a dent into Red's quarterly profits.

We drove to Lava Beds National Monument in northern California and
explored the lava tube caves [some more than a mile in length]. Lava tubes form when molten lava flows from a volcano in a narrow stream. The outer surface of the flow cools and hardens while the
interior remains liquid. When the volcano stops emitting lava, the liquid drains from the hardened shell and leaves a tube, which is, by definition, hollow.
The park provides lanterns and sells souvenir helmets. We used our bicycle helmets to protect ourselves from the low ceilings and sharp projections. The floors of the caves are uneven, as are the
roofs. With only the flashlight we must watch the floor, ceiling, and sides. It makes for slow going. We did not trip or slam the ceiling. Even in the pitch dark, creepy things did not bother Sarah [I kept my hands to myself]. There are turns and side tubes. One can get lost if you miss a turn or mistake a side cave for the route out.

If we don't get out of California within the next few weeks, we'll have to start paying taxes, so we're on the move.

The rock climbing that I did in Pinnacles turned out to be a lot of fun.



No special training is required for rock climbing, any fool can do it. Dan, however, is trained and certified to hold the end of the safety rope [the belay person]. It is a special rope that has some give so that if/when one falls, one is not brought to a jarring, injury-causing, stop. Since the safety rope runs through a carabineer and is, in effect, a simple pulley, I don't understand why, if I were to fall, I wouldn't end up on the ground and Dan in the air since I out-weigh Dan. I didn't fall, but I did rappelle down.

Rock climbing, as is biking, scuba, and hiking, is primarily lower body exercise, just not aerobic. We seem to be getting a lot of lower and middle body exercises, but not enough upper body exercises. Carrying air tanks and moving the bikes off and on the van don't count.

Skagway, Alaska
July, 2002

We have left British Columbia and are now in the Yukon. This is the place to be to have lots to do during the day. The sun is in the sky for 20 hours a day and is not far below the horizon [which is in the north] at 'night.' This area calls itself 'The Land of the Midnight Twilight.' Since the curtains on the van are only for privacy, we have to put cardboard between the curtains and the windows to make it dark enough to sleep.

We took the western route to here from Prince George, the 'Capital ' of Northern B.C. The western route is the Stewart-Cassiar Highway

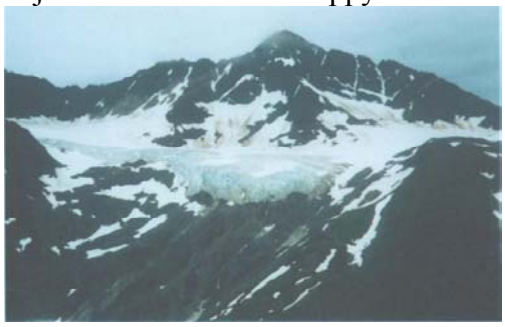
which has been 85% paved since we drove it last in 1986 when it was 85% dirt.

The road has a spur to Stewart. B.C. and neighboring Hyder, Alaska. We drove the 40 mile spur and stayed in Hyder. Hyder uses Canadian currency and keeps Pacific Time. [Alaska is on Yukon Time, the Yukon and B.C., are on Pacific Time.]

The road to Stewart passes about 20 glaciers, most impressive is the Bear Glacier which is blue. Many of the glaciers are hanging. Sarah said that some of those were very well hung.

While in Hyder we spent about 3.5 hours at Fish Creek hoping to see
grizzly bear which frequent the area to feed on the spawning salmon. Expectation plays a big role in excitement. Since we were here to see grizzlies, we were disappointed, after spending three hours watching salmon spawn, a beaver swimming back and forth constructing a dam, a black bear coming to the creekside to feed on berries, and numerous bald eagles flying about. [One came within a dozen feet
of us.] We saw the eagle catch a small furry thing and take it to a tree for dinner only to see another eagle swoop down and steal it.

We were going to leave in disappointment at 10 p.m. when the grizzly appeared and gave us a good
show. He stalked around the creek for a few minutes [coming as close to us as 15 feet], then started to splash around in the foot-deep water eventually coming up with a salmon in its jaws. Then we were happy!



The main reason that we came to Skagway was to see the glaciers in
Glacier Bay National Park. After several days of poor weather, we finally got some blue skies and headed for the office of Skagway Air http://www.skagwayair.com Sarah, the pilot and I headed over the mountains.
We went up and down the fjords following one glacier from the
snowfields, through the fjords to the bay and up other fjords following other glaciers from their toe to the ice fields. I had planned to finish the roll of film in the camera, but the scenery was so magnificent that I also finished a second roll of film. The immensity of the snow and ice as seen from the air is awesome!

We watched the tiny [as they appeared from the air] cruise ships plying Glacier Bay and watched for calving of the glaciers.

The waters were studded with pieces of glacial ice. At one point, when the pilot spotted some mountain goats, he banked the plane and headed almost straight up the side of the fjord so that Sarah & I could get a better look.

Fraiser, BC
July, 2002

Alaska, the Yukon, and northern British Columbia each consider the mosquito to be their official bird. We found the mosquitoes in B.C. to be fierce. We hardly saw any in Skagway. In the Yukon there was not a single mosquito: They were all married with large families.
In the U.S., 'slapdash' refers to poor

construction; here it describes a trip from the R.V. to a building. Some of the outhouses in the B.C. provincial parks have screens. The screens keep the mosquitoes trapped inside. Having mosquitoes trapped in the outhouse in not a bad thing. It gives you something to do while you're waiting to do something. When we walked around, we often wore our mosquito-netting hats. Other times, we wished that we
were wearing our mosquito-netting hats. Don't get us wrong, it's not that the places here a just filled with mosquitoes, there are other flying insects as well. Also, the mosquito season is short; then it is black fly season. Black flies don't
puncture your skin; they bite out chunks. The major problem with mosquitoes in the van is that the walls and ceiling of the van are covered with fabric. If we hit a mosquito anywhere but a cabinet face, we get a blood spot that has to be washed out rather than wiped away. We were given battery-powered devices which emit sounds that are supposed to repel mosquitoes. By using these devices, we were able to determine that the mosquitoes of the Pacific north are deaf.

Omaha, NE
August, 2002

Hi!
It was a rush to get this far east in so short a time. We accomplished some of our goals. Ashfall, a fossil site from about 10 million years ago in north Eastern Nebraska was a place that we had tried to visit in 1999, but got there after the end of the season. They are located six miles from the middle of nowhere and don't get too many visitors when it is not the tourist season [They don't get too many tourists when it is the tourist season, either.] They are one of the three divisions of the Nebraska State Museum. What make Ashfall unusual is that a large amount of ash from a volcano in S.W. Idaho buried a large number of mammals and other animals quickly. Bones were undisturbed by scavengers, etc. The display has the fossils [actual bone, not mineralized bones], in relief as they were found. It makes for an interesting site as the skeletons were found basically intact rather than a head here, a shoulder somewhere else. We also had the opportunity to discuss the dig with the paleontologist who has been working here for twenty years. We also watched him uncase a rib that had been wrapped in plaster since the original dig here in the 1970s as he explained the process to us.
The link below shows a good photo of part of the main exhibit.
http://www.museum.unl.edu/ashfall

We made good time with Sarah at the wheel. She has been doing almost all of the driving since Dawson's Creek, BC and has been doing a good job putting hundreds of miles behind us almost daily. We'll most likely be home in a few days.

Regards,
A&S

"Unlocking the Mystery of Life": a case study of Intelligent Design Creationism's tactics.

In their ongoing attempts to weaken the teaching of evolution in public schools, proponents of Intelligent Design Creationism (IDC), backed by the Discovery Institute think-tank in Seattle, have undertaken a major media campaign aimed at disseminating three key themes of their public relations strategy: i) that evolutionary theory is in crisis because of its inability to explain fundamental aspects of the biological world, ii) that an increasing number of *bona fide* scientists are critical of evolutionary theory, and iii) that scientific evidence suggests that an extra-natural "intelligence" is responsible for the most, if not all, the diversity of life.

The Discovery Institute's skillful use of mass media and of high-profile contacts among political and news personalities have granted these unfounded claims significant exposure among a public often not sufficiently trained to evaluate them. The IDC documentary "Unlocking the Mystery of Life" (UML), which has been broadcasted by several TV stations around the nation, including the NYC Dept. of Education's own WNYE, is part of this strategy of supplying a patina of scientific legitimacy to what is, ultimately, another example of Creationist pseudoscience.

The following is a slightly modified version of a critique of the documentary, originally written to accompany a letter sent to the WNYE station managers in anticipation of the video's broadcast. Eventually, WNYE aired the program with a disclaimer regarding its Creationist contents [1].

The source

"Unlocking the Mystery of Life" is the first and only production of an entity called "IllustraMedia". In fact, "IllustraMedia" is one and the same with "Discovery Media Productions" [2]. Discovery Media is a production company whose previous videos are devoted to evangelical topics, such as "Heaven and Hell" and "The End Times"[3]. While there is nothing wrong with an evangelical video company producing a science documentary, the fact that to do so it was felt necessary to create a "shell" production outfit highlights the aura of ambiguity that pervades the entire enterprise (more examples to follow). Indeed, this is not the first time IDC proponents try to conceal their links to religious organizations and notions: although the Discovery Institute's IDC operations are funded in large part by fundamentalist millionaire Howard Ahmanson [4], the Institute has recently gone through multiple reiterations of its logo and web site, erasing obvious Christian iconography and evangelical "buzzwords" [5]. Within fundamentalist circles, however, the propagandistic and religious nature of the video, rather than its scientific/educational merit, is openly recognized as its chief goal and significance. For instance, Mission Frontiers, the Bulletin of the evangelical U.S. Center for World Missions, hails it as "the most impressive evangelistic tool ever made" [6].

The contents

As a documentary, UML is a skillful and sophisticated production, showing some well-made computer animations of cellular processes at the molecular level. In discussing such mechanisms, the video claims that the scientific evidence points to

insurmountable difficulties for standard evolutionary theory, and supports instead the hypothesis that a superior intelligence directly intervened to create and diversify life (hence the name "Intelligent Design" [7]). The video discusses such purported evidence and devotes much of its time to the historical origins and philosophical underpinnings of the ID movement.

The fundamental question is whether ULM conforms to basic scientific standards of adherence to evidence and facts. In this, it fails at several levels. First of all, throughout the documentary mainstream scientific views, supported by the overwhelming majority of scientists, are not even independently presented. Instead, oversimplified, sometime downright scornful presentations of mainstream scientific theories and hypotheses are provided by supporters of ID (as a counterexample, the recent PBS "Evolution" series, though clearly favoring a scientific view, featured the opinions of several prominent representatives of Creationism). In UML, therefore, the viewers are treated to descriptions of scientific evidence and theories that have little connection with what is in fact going on in the science world. For reasons of space, I'll just mention a few examples.

The most glaring omission deals with UML's discussion of Origins of Life (OoL) science. The only non ID-based views on OoL discussed in the video are those proposed, in the late '60s, by one of the current ID proponents, Dr. Dean Kenyon. According to UML, those models have been later shown by Kenyon and colleagues to be insufficient to explain key aspects of early molecular and cellular evolution. In fact, most of Kenyon's original views have long been superseded by more thorough, and better empirically supported, scientific hypotheses – indeed, it was those hypotheses and evidence that led to the demise of Kenyon's ideas in scientific circles long before ID Creationism appeared on the scene. Alas, what is arguably the current (and has been for more than a decade now) favored hypothesis about OoL, the so-called "RNA World" model [8], finds no mention whatsoever in UML. This is not surprising, perhaps, since the objections raised in UML by ID proponents to Kenyon's original theory would not stand against this new model. Thus, the viewer is given the false impression that the current scientific choice is between ID Creationism and its outright miraculous Origin of Life, or Dr. Kenyon's outdated 1960's theory. Of course, our understanding of OoL is still very limited, and highly speculative. Nevertheless, it is far more advanced and scientifically sound than the UML parody would want its audience to believe.

Other mistakes in UML include an equally superficial, almost mockingly simplified discussion of cooption, a crucial evolutionary mechanism for which in fact significance evidence exists in the biological world. UML's "experts" even commit a basic error regarding the role of nucleic acids in the cell, which are presented as uniquely involved in genetic information storage and transfer, while it is now well known that they are directly active in crucial molecular processes functionally comparable to those carried out by protein enzymes - a key piece of evidence in favor of the "RNA World" hypothesis mentioned above (and the possible reason why it also went unmentioned).

The crucial argument underlying the whole ID philosophy, widely discussed in the video, is the concept of "irreducibly complex" systems, and the purported impossibility of conventional evolutionary mechanisms to generate them. Although it was quickly rejected by biologists on theoretical and empirical grounds [9], "irreducible complexity" has remained the main staple of ID Creationism. Ironically, this argument was just recently delivered a fatal blow in the prestigious science journal Nature, where a computer simulation based entirely on evolutionary principles (undirected random

mutation and selection) was shown to be able to generate "irreducibly complex" outputs [10]. While of course the video cannot be faulted for not predicting the results of future scientific research, this episode serves as a good example of the shaky grounds on which ID reasoning is built. Indeed, not only does scientific evidence continue to accumulate contradicting the ID arguments, but even more damningly, in over 10 years from the onset of the "movement", **no single scientific result supporting ID has been published in the scientific literature**, despite its supporters continuing claims of the existence of such results. Indeed, even the ID advocates' own journal, the electronically published Progress in Complexity, Information and Design, has failed to publish any experimental result supporting ID [11].

In short, despite the appeals by ID advocates to "let the evidence speak for itself", there is in fact no positive scientific evidence in support of ID, and on the contrary the theoretical arguments of its advocates are constantly being superseded by findings in the professional literature. To avoid facing this lack of evidence, UML resorts instead to systematic distortions of mainstream science theories and omissions of key ideas and pieces of evidence.

The people

The experts interviewed for UML, and ID advocates in general, are fond to present themselves as "scientists", often accompanied by the qualifier "a small but growing number of". The Discovery Institute is famous for its lists of Darwinism-doubting "scientists", regularly "padded" with individuals with all kinds of science or technical degrees, regardless of field of expertise or occupation (biology graduates, let alone actual professional scientists, being a negligible minority) [12]. In fact, most ID advocates are not scientists by any meaningful definition of the term, and their actual numbers (for which "small" is an overstatement) are anything but growing.

Of the IDC advocates who appear in UML, 4 can in fact qualify as bona fide scientists: Michael Behe, Scott Minnich, Dean Kenyon, and Jed Macosko. The first two hold tenured positions in Biochemistry and Microbiology, respectively, at mainstream universities, but despite their own research experience and active labs, in over a decade of IDC activism they have failed to produce any empirical evidence in support of their ideas. Dean Kenyon scientific activity essentially ceased in the mid-'70s [13]; however, he has since co-authored the notorious Creationist school textbook "Of Pandas and People" [14]. Dr. Macosko is introduced as a "Molecular Biologist, UC Berkeley". Although he is a recent Berkeley graduate and, briefly, former postdoctoral trainee, Dr. Macosko is not, nor has ever been on the Berkeley faculty, as that title would seem to suggest. [Currently, Dr. Macosko is listed on some ID web sites as teaching chemistry at the religious La Sierra University in Riverside, CA [15], although he does not appear on the faculty list there either [16].]

Such "generous" interpretations of credentials is not unique in the documentary. One of the leading proponents of ID, William Dembski, is labeled as a "Mathematician – Baylor University" in UML, presumably because he holds a PhD in Mathematics (together with one in Philosophy and a M.Div. in Theology), but his entire work, with a single 1990 paper exception, is about various aspects of theology, apologetics and philosophy [17]. Indeed, Dembski is currently a faculty member affiliated with Baylor's Institute for Faith and Learning, which focuses on theology and philosophy [18]. Finally, Jonathan Wells, presented as "biologist" in UML, while holding a Ph.D. in Developmental Biology from UC Berkeley is actually a full-time Discovery Institute anti-evolution activist. By his own words, he entered the Ph.D. program not based on any

genuine interest in science and biology, but following the direction of the Rev. Sun Myung Moon, with the expressed goal to "devote [his] life to destroying Darwinism" [19]. Not surprisingly, there is no record of Dr. Wells performing any meaningful research work after his training at Berkeley; his later anti-evolution propaganda work includes the book "Icons of Evolution", some editions of which even contained stickers for students to deface biology textbooks [20].

Thus, just as in Discovery Institute's "scientist" lists, the academic affiliations and/or relevant expertise of the participants in UML are presented in just ambiguous enough terms to inflate the impression of scientific authority and clout.

In summary, "Unlocking the Mystery of Life" is a depiction of a fringe, at best semi-scientific philosophical movement very close, ideologically and organizationally, to religious Creationism. The documentary misrepresents itself, its goals, the existing scientific evidence and its own experts in several significant ways. In this respect, it exemplifies the strategies employed by the Discovery institute ands its affiliates to sway public opinion into believing that empirical support for evolution is waning and that legitimate scientific opposition to evolutionary theory's basic tenets is on the rise. Biology teachers nationwide should be aware of this video and of its potential effect on viewers, including their own students.

Notes

1. see the National Center for Science Education web page (http://www.ncseweb.org/article.asp?category=19) for the original version of this critique, the text of WNYE's disclaimer and other comments about "Unlocking".
2. Verifiable by a "WHOIS" search for the domain name "illustramedia.com": http://www.networksolutions.com/cgi-bin/whois/whois?STRING=illustramedia.com&SearchType=do Accessed 6/30/03
3. http://www.discoverymedia.org/dm_products_page.htm Accessed 6/29/03
4. "Heir spends family fortune to discredit evolution theory", Scott Stephens, The Plain Dealer, Cleveland, 12/03/02; http://www.cleveland.com/debate/index.ssf?/debate/more/1040639430179810.html .
5. http://www.ncseweb.org/resources/articles/4116_evolving_banners_at_the_discov_8_29_2002.asp. Accessed 9/13/03
6. http://www.missionfrontiers.org/2002/06/PDFs/Unlocking_Mystery.pdf Accessed 6/28/03
7. For an in-depth discussion of ID Creationism, see "Intelligent Design Creationism and its Critics", Robert T. Pennock, ed, MIT Press, 2001, ISBN 0-262-16204-0; review in http://www-unix.oit.umass.edu/~cheathwo/Phil100/nytimes.html Accessed 6/30/03
8. Dworkin JP, et al. The roads to and from the RNA world. J Theor Biol. 2003 222:127-34. Meli M, Albert-Fournier B, Maurel MC. Recent findings in the modern RNA world. Int Microbiol. 2001 4:5-11. Also: http://www.lawrenceroberge.com/RNAWORLD.htm Accessed 6/30/03 http://www.americanscientist.org/template/AssetDetail/assetid/21438?fulltext=true Accessed 6/30/03
9. see for instance several articles by Dr. Ken Miller, Brown University: http://www.millerandlevine.com/km/evol/ Accessed 6/30/03
10. Lenski RE, Ofria C, Pennock RT, Adami C. "The evolutionary origin of complex features." Nature. May 8 2003; 423 (6936):139-44
11. http://www.iscid.org/pcid.php Accessed 6/29/03
12. For a recent example of the Discovery Institute's use of "scientist" lists, and to gain an idea of the relative standards of inclusions, see the list of Texas "scientists" the Institute recently advertised as part of their campaign to influence textbook choices in that State: http://www.discovery.org/viewDB/index.php3?command=view&id=1555&program=News (accessed 9/13/03). A tongue-in-cheek parody of Creationist lists is found at the National Center for Science Education "Project Steve" site:

http://www.ncseweb.org/article.asp?category=18 (accessed 9/13/03).
13. The last publication from Dr. Kenyon found in the main scientific literature databases (Pubmed, BasicBIOSIS, CSA Biological Sciences, and the Institute for Scientific Information's "Web of Science" Science Citation Index) dates to 1976. However, Dr. Kenyon himself has informed me he is the author of one later publication ("A Comparison of Proteinoid and Aldocyanoin Microsystems as Models of the Primordial Protocell", in Molecular Evolution and Protobiology, K. Matsuno, K. Dose, K. Harada, and D. L. Rohlfing, eds, pp. 163-188, Plenum Press, 1984); this book article does not seem to appear in any of the databases, nor has it apparently ever been referenced by any other later publication also in the database.
14. http://63.74.14.138/page/001/PROD/BOFPA1, reviewed at the National Association of Biology Teachers web site http://www.nabt.org/sub/evolution/panda1.asp Both accessed 6/30/03.
15. http://www.iscid.org/jed-macosko.php ; http://www.lasierra.edu/ Both accessed 6/30/03
16. http://www.lasierra.edu/resources/phonelists/phonename_m-s.html Accessed 6/30/03
17. http://www.designinference.com/documents/05.02.CV.htm Accessed 6/30/03
18. http://www3.baylor.edu/IFL/ Accessed 6/28/03
19. http://www.tparents.org/library/unification/talks/wells/DARWIN.htm Accessed 6/30/03
20. Links to reviews of Icons of Evolution can be found at the National Center of Science Education's web site http://www.ncseweb.org/resources/articles/9855_reviews_of_icons_of_evolution_10_31_2002.asp Accessed 6/30/03

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BASIC SKILLS IN SCIENCE # 67

By Don Abramson

Do you remember the story of the sorely frustrated farmer who absolutely couldn't get his mule to budge? He pushed and he pulled and he pulled and he pushed but the animal stubbornly lived up to its species reputation and refused to move.

At that point, a neighbor who had been observing these futile efforts said "Here, let me try." The neighbor reached down and picked up a hefty tree limb from the ground and swung it high above his head. He then brought it crashing down onto the fortunately thick skull of the mule, stunning the beast and driving it to its knees.

"Why did you do that?" exclaimed the indignant owner – "you almost killed my mule?"

'True enough," said the neighbor.

"…but at least now you have its attention."

Well, no one is going to use a tree limb on you head to get your attention but maybe what follows will help.

GOLDEN OLDIES

The first of these Basic Skills in Science appeared in ADAPTATION in the Fall of 1981. Since then there have

been sixty-five more (a number that even staggers me). Each column was designed to provide science instructors with stories and strategies to bring and noble profession.

So, where were you 22 years ago when all this started? Read on and gain wisdom from the recycling of what I prefer to think of as "Golden Oldies,"

Let's start with the word "it." You probably never realized what a truly remarkable term this is. There's just so much information implied within its two letter confines. The following examples were broadcast by radio station WINS, based on reports issued by the Bronx Zoo. The comments are mine.

1. "A lion can do it fifty times a day. (No wonder the king of beasts is seen yawning when you visit the zoo.)
2. "Orangutans do it while hanging upside down." (Bats okay, but the idea of the orangutans simply boggles the mind.)
3. Rhinos have foreplay that lasts for a month before they do it. (Listen, wouldn't you take your time too if your prospective partner weighed over two tons and had that wicked looking horn?)

I always referred to this one with the title, Measuring up. Read on for enlightenment.

While crossing the Queens College Campus one day, and in response to a variety of internal stimuli, I decided it would be expedient for me to visit the nearest building and make appropriate use of the facilities. Upon approaching the wall mounted porcelain fixture I was startled to observe that someone ha taped a Xeroxed copy of a 12-inch ruler to it.

Now you must admit that this is not the sort of thing that you would normally expect to come upon in an academic setting. Is one supposed to stand there and measure? Under these circumstances, the term "trajectory" might come to mind. Any other assumption would just be speculative.
The one thing I was certain of though, was that whoever perpetuated this dastardly deed, it was not a science person. Of course not.

A science person would have used a metric ruler.

This one is from a column in ADAPTATION that appeared in the winter edition of 1985. The column was titled A Few Words Here and There.

We've all heard tales of young children left temporarily unattended and the mischief that ensues. The following story presents a particularly poignant example of this.
A two year old boy somehow got hold of a pocket edition of a science dictionary and proceeded to consume it, page by page.

When his shocked parents became aware of what had taken place they quickly rushed their son to the nearest medical facility.

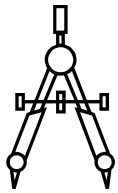
The emergency personnel labored long and hard over the small child, administering laxatives and pursuing other appropriate procedures.

Sadly, however, despite the expenditure of their best efforts, they couldn't get a single word out of him.

Conclusion time. Of all of the words I've shared with you and those who came before you, perhaps the ones that follow best describe what being a science educator is all about:

Come to the edge.
No, we will fall.
Come to the edge.
No, we will fall.
They came to the edge,
Were pushed, and they flew.

Don Abramson is a retired former Assistant Principal/Science of a Queens High School. He moved on to 14 years as a a lecturer in the Biology Department of Queens College, and recipient of their $5,000 Teacher of the Year award. Currently is retired yet again.



Where are these NYBTA members going?

s Precollege Science Education Pro K-12 Teachers (Science Outreach):

Science teachers in public, private, or parochial schools in the tri-state area are enc w.
About gai

GUIDELINES FOR ADAPTATION

- **RITE AN ARTICLE O IC L TOPIC**

SUBMIT A RESEARCH REPORT OR LAB EXERCISE / DEMONSTRATION

SEND IN PHOTOGRAPHS OF NATURE OR BIOTOPIC

IF YOU CAN DRAW – SEND IN NATURE OR BIOLOGY SUBJECTS

HAVE A COMMENTARY OR LETTER TO SHARE WITH MEMBERS

INFORMATION ON EVENTS OF INTEREST TO ANNOUNCE / NOTE

rticles, Reports, Exercises, Letters, Commentaries or Demos should be 1 – 5 pages including hotos and / or diagrams (Longer features will also be considered fo publication)

uthors and those submitting features or photos etc. should identify themselves with title,

x

NEW YORK'S SALT MARSHES:

On May 18th of this year, Ranger Bonnie McGuire took our members on a tour of one of the prettiest and most biologically productive communities in the five Boroughs: the Salt Marsh Nature Center at Gerritson Creek, Brooklyn.

Her message didn't sink in right away; we were all too busy ooh-ing and ahh-ing at the stretches of natural beauty around us, to listen.

The message, when it dawned on us, was that despite several hundred years of trashing, dumping, burning and filling, this great natural filter for runoff has begun to prevail once again. This is no accident.

Prior to the mid-1940's, use of this Estuarian shore was limited by the number of destructive forces in the city; few were willing to finance the effort to fill for development, and remained content to do so fortuitously – waiting for the piled of waste dumped at the estuary's edge to take the shape of new land on which to build, or dump again.

After that, until 1964, this convenient candidate for the urban midden was the recipient of organized effort. For example, a core in Mill Basin (Canarsie) would go through 25 feet of City waste – garbage, sewage sludge, sand, top soil – before hitting the pre-Dutch clay. Most of southern Long Island is an outwash plain from the backbone of terminal moraine on the north shore. Any storm erosion these days exposes old garbage.

The legal dumping ended, most likely, by the mid-sixties. Since then, increased efforts have been directed at maintaining these highly productive shoreline areas.

The trails on which we walked were built in the 1980's. "The salt marsh

is the liver of the sea." Park Ranger McGuire repeated, suggesting that city folk refrain from fishing and clamming there.

"There are lots of red mussels. The grasses you see around you are held in place by them! They eat natural detritus. Red Mussels are like vacuum cleaners. Don't eat tem, either; would you eat from a vacuum cleaner bag?"

Just then, a cat-bird began its song, distracting us yet again from the science of the place. I was saddened to learn that the Phragmites (see cover) all around us were invaders. We stared blankly over at White Island, like a huddle of climbers high on oxygen.

Beware, NYBTA-ers! Activities such as this one have a decidedly unscientific habit of tickling the aesthetic into giddiness. Awed laughter at the beauty of lamb's-ear, mugwort, staghorn, sumac, bayberry or milkweed dancing in the fragrant, gentle breeze was not uncommon. We pressed on, learning that White Island, with its Van Gough-like broken down bridge, surrounded by derelict boats, is free of Phragmites due to a fire several years ago.

It wasn't long before the mile-long trail through this waterside paradise came to an end. We milled about sheepishly, not quite knowing what to do other than wonder what an entire afternoon in any season might be like here.

The salt marsh is a collection of organisms that cooperatively took advantage of one of those rare tid-bits Nature throws at life as it struggles under selective pressure: All of these organisms benefit from the runoff that spills randomly and broadly into the sea. At the mouth of a river like the Hudson, the selective advantages are everywhere. Not content to wallow in this natural banquet, life in the salt marsh has sequestered itself into four vertical zones:

1. Mud-Flat, where we saw many small holes, tattling on the fiddler crabs that wait for warmer weather to come out and duel.
2. Low Marsh, home to cord grass and *Spartina alterniflora* (…that has

root membrane that limits salt intrusion; if salt gets in, it's excreted through leaf pores. It even takes in some salt into cells, to decrease osmotic loss of water. Try demonstrating *that* in your class!)

3. High Marsh, with its shadowy salt meadow hay, and
4. Upper Zone, dry enough for shrubs and small trees to grow:

The entrance to the Salt Marsh preserve at 33rd Street and Avenue U is deceptively un-pastoral.

After an NYBTA board meeting we left through it, grabbing fliers and info-brochures put out by the Parks Commission, discussing ways to use this experience in our classrooms.

The Nature Center has regular tours, if you can just keep from getting emotional and listen up, hah? You can call them at (718) 421-2021. Most of us plan to do this, while considering the right stuff to put on the trip forms, letters of permission and transportation arrangements. We're real pro's, ain't we?

Z. Stern, B. McGuire, J. Rolnick, M. Cleckley, S. Rolnick, M.Cohen , A. Rolnick, M. Smatara, M. Orlian

NEW YORK BIOLOGY TEACHERS ASSOCIATION
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_____ NYBTA Membership AND Discover Magazine $28.00, before 12/31/03

_ NY TA Membership AND Discover Magazine $30.00, after 12/31/03

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RECENT ADVANCES

STEINHARDT SCHOOL OF EDUCATION Department of Teaching and Learning and COLLEGE OF ARTS AND SCIENCE:

2003-2004 RECENT ADVANCES IN SCIENCE Saturday Morning Seminar Series, An outreach program Directed by Malka Moscona, Ph.D., www.nyu.edu/education/teachlearn/ras/

This Seminar Series is part of the Science Education curriculum and is partially funded by Teacher/Leader Quality Partnership Program, SED

***New Teachers will receive promotional credit.

All seminars will be presented in the silver Center (formerly the Main building) On the corner of Washington Place and Washington Square East. "Recent Advances in Science" is an on-going, interactive series of Saturday morning seminars on current research topics and recent progress in the burgeoning field of biological and biomedical sciences. The program is designed for high school and middle school science teachers. It offers teachers the opportunity to meet with leading scientists working at the frontier of biological fields, who are also outstanding speakers and teachers. Each spea

Each will address issues and questions which motivated their studies and describe their research strategies and recent discoveries.

The seminars offer teachers a unique opportunity to learn about recent developments at the forefront of scientific progress.

By and large, middle and high school textbooks do not include such latest advances.

Textbooks rarely reflect the drive and dynamics of scientific exploration and discovery. Also hidden is the imperative that, in order to be successful, both scientists and teachers must be lifelong learners and explorers, forever challenging the boundaries of knowledge and education. Through an "open workshop" format, this program fosters a collegiate relationship between research scientists and school teachers.

Teachers are encouraged to invite interested students to the lectures, to ask questions and meet the speakers. The overall intention is to provide up-to-date knowledge and catalyze intellectual curiosity and excitement, but also provides teachers with access to tools that they can modify and use in their development of science curricula and the students' research projects.

2003-2004 marks the sixth year of the full program. Since it's first session in 1998, the personal contact between practicing scientists and practicing teachers has led to on-going exchanges and networking that extend beyond the Saturday morning sessions.To reserve space, food, lab space and receive important advanced information, please call Jackie Daniel at 212/ 998-5498 or email her at jd55@nyu.edu

September 20, 2003 Silver Center (formerly Main Building) Rm.401 Recent Advances in Human Molecular Evolution Studies TODD DISOTELL, Ph.D Associate Professor, Department of Anthropology, New York University "http://www.nyu.edu/gsas/dept/anthro/faculty/disotell.html"

October 25 Room # to be announced Development of the C. elegans Germ Line (PM Lab visit) JANE HUBBARD Assistant Professor, Department of Biology, New York University "http://www.nyu.edu/classes/hubbard/research.2003.html"

November 15, 2003 Silver Center Rm.414 Embryology in the era of genomics: Using C. elegans to learn how the genome directs the single celled egg to form an organized multi-cellular animal, FABIO PIANO, Assistant Professor, Department of Biology, NYU www.nyu.edu/fas/dept/biology/faculty/piano/

December 13, 2003 Silver Center Rm. 405 The End of Stress As We Know It. Mechanisms underlying stress and sex hormone actions on the brain. BRUCE MCEWAN Alfred E. Mirsky Professor, The Rockefeller University www.rockefeller.edu/labheads/mcewen.html

Frontiers in Physiology Fellowship

Science teachers of grades 6-12 are invited to apply for this yearlong immersion in the world of cutting-edge physiology research. Teamed with a local scientist, Fellows do hands-on research for seven-eight weeks during the summer as well as explore and practice teaching methods that integrate inquiry, equity and the Internet into their classrooms.

The Fellowship concludes with a trip to a scientific conference in San Diego, CA. Awardees receive a stipend of up to $8500 over the year that includes travel and a materials mini-grant.

Applications are due January 9, 2004.

For more information about the Fellowship, check the APS web site (http://www.the-aps.org/education/frontiers/app.html) or contact Kathleen Kelly in the Education Office.

Kathleen Kelly
K-12 Programs Coordinator
American Physiological Society
9650 Rockville Pike
Bethesda, MD 20814-3991
301 634 7132 kkelly@the-aps.org

INTERNATIONAL COASTAL CLEANUP™ DATA CARD

Data collected during The Ocean Conservancy's International Coastal Cleanup™ is used to educate people and create solutions to the problems of solid waste and litter. Through partnerships with business, government, environmental groups, and citizens, we are helping to change the behaviors and practices that create debris. Thank you for being part of this very important process.

The Ocean Conservancy

Advocates for Wild, Healthy Oceans

TION

horeline/Beach ☐ Underwater

Kings

Day 20 Year 03

s Card:

Location of Cleanup: State NY Country USA

Beach Site Name: Gateway NRA Floyd Bennet Field Aviation Road Fishing Beach

Name of Coordinator: J. McHugh / NYBTA

Distance Cleaned: miles or km

Total Estimated Weight Collected: lbs. or kgs

UR GROUP

r of The Ocean Conservancy and/or joining our Ocean Action Network (OAN) to make vation issues, please check the box(es) below your name and address. ***Thank you for***

Age:

Zip

Phone

Email:

I would like

N

2. Name:

Address:

City:

Zip Code:

Phone: ( )

Email:

I would like information on: ☐ The

N

3. Name: Age:

Address:

City: State:

Zip Code: Country:

Phone: ( )

Email:

I would like information on: ☐ The Ocean Conservancy ☐ The OA

4. Name: Age:

Address:

City: State:

Zip Code: Country:

Phone: ( )

Email:

I would like information on:

ENTANGLED ANIMALS: (☐ Dead or ☐ Alive). List all entangled animals foun

entangled in (fishing line, rope, net, etc.)

WHAT WAS THE MOST PECULIAR ITEM YOU COLLECTE

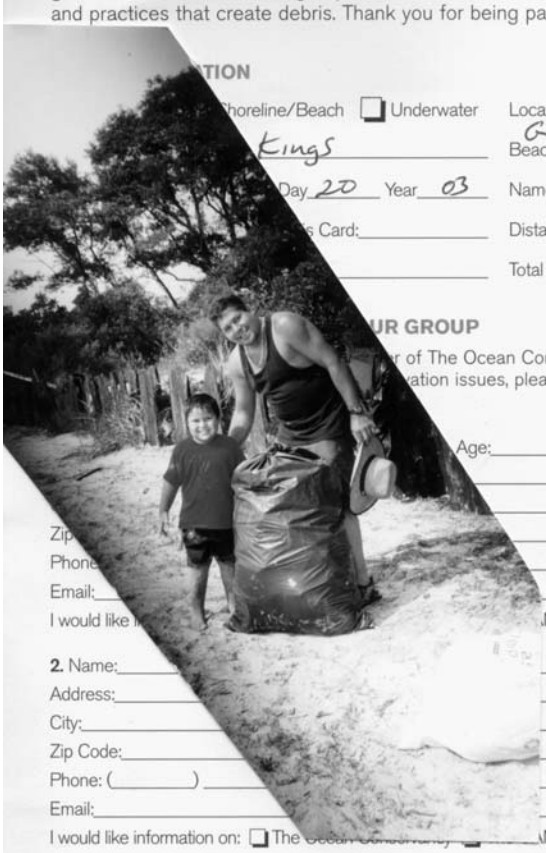
The following national and international organizations endorse and/or support the International Coastal Cleanup

- U.S. Environmental Protection Agency
- IUCN – The World Conservation Union
- Intergovernmental Oceanographic Commi Nations' Educational, Scientific, and Cult

mail it to:

Prevention and Monitoring

International Coastal Cleanup



THESE ENVIRONMENTALLY CONSCIOUS MEMBERS HAVE JUST SPENT…

A DAY AT THE BEACH

Sar h Rolnick

On September 20, we were favored with a comfortable breeze off of Jamaica Bay as NYBTA members worked with the American Littoral Society to catalog and collect human-caused debris from coastal areas. NYBTA's area, Aviation Road Fishing Beach of Gateway National Recreation Area's Floyd Bennett Field, had recently been scoured by the rough surf caused by hurricane Isabel as was attested to by the foot-high kerf in the sand that was half-way up the 30 foot wide strip of beach in the shadow of the Marine Parkway Bridge.

Even with the natural cleansing of the beach, NYBTA was able to catalog and collect 280 pounds of man-made materials in two hours. Some items of particular interest were an automobile battery, a shotgun shell, and 1/2 of a toilet seat.

The most numerous items found were cigarette filters, which are not biodegradable. 280 pounds doesn't sound like too much to collect from a quarter-mile long beach, until you realize that almost all of the items collected (plastic bags, straws, cigarette filters, etc) are of negligible weight. Our dozen large plastic bags of debris almost filled the back of the NPS's pick-up truck.

Unlike years past when much of the material washed up onto the beaches were beverage containers, the container deposit law has drastically reduced this item from recent surveys. Plastic bottle caps, however, were abundant. Much of the material found on the beaches, we learned, washes ashore from street waste that was washed into storm sewers. I won't say the beach was clean enough to eat off of after NYBTA finished, but we didn't have to.

After cleaning up at Gateway's Ecology Village, we were treated to a catered picnic luncheon of Chicken Marsala, sausage & peppers, meatballs, and stuffed shells. There were vegetables & salad, too, but who cares? There was live music, too.

One participant was so into the collection process, that he didn't join us for the luncheon. A member of our group brought food back to the beach for him because he was still collecting.

We also appreciated the opportunity to get together with some old friends for a pleasant day at the beach and meet some new people.

A&S

STIR's Adele Kupfer

SCIENCE TEACHERS IN INDUSTRY & RESEARCH

Thanks to Adele Kupfer

Adele Kupfer is an unassuming, creatively retired chemist with a humble flair for leveraging corporate research and overstock into philanthropy. She bears no family resemblance to Santa Clause. Moreover, those teachers who have benefited from her acquaintance are impressed that a person so slight of physical stature can swing arrangements between us and chemical giants like Pfizer, Exxon, Bell Labs, Brinkman Instruments, Ciba, Merck, Akzo Nobel, Novartis and Wyeth-Ayerst.

This author was invited on stipend into the Akzo Nobel Corporation's labs in Westchester during the summer of 1995, and incorporated directly into research. In fact (accompanied by my trusty 1970 edition of Morrison & Boyd's "Organic Chemistry", I sat in on research strategy meetings, was entrusted with the un-boxing and assembly of a brand new Dionex HPLC, and was walked through the development of methodologies and data collection for detecting organic peroxide impurities in one of their products. Prior to this experience, I *thought* I had been teaching science. Somewhere between pipetting solutions & dilutions in front of a hood, and realizing the uselessness of having two independent variables in the same experiment, I anxiously began developing lesson plans that would have my own students doing science instead of listening to me lying to them about what it is.

In Ms. Kupfer's words:

"In 1992, recognizing that older but useable surplus equipment was available in pharmaceutical companies, chemical plants, and medical universities, Project STIR set out to encourage and facilitate the transfer of this equipment into the schools."

…And transfer they still do! While out on a summer trip this year, I received an Email from Mark Langella (formerly a fellow in STIR, now managing a spin-off of the organization known as WISTA – Westchester Industry and Science Teacher Alliance). The note simply said that if I wanted a Gas Chromatograph/Mass-Spec combo for my school, I should show up at the back door of a Chemical company-gone-bankrupt, on August 14th.

"To date, 56 companies and universities have donated an estimated 102,000 items to 165 NYC area high schools, mostly inner-city schools. Items of equipment range from basic laboratory glassware to high-tech analytical instruments, from capital equipment such as ovens and centrifuges to older computers and computer parts."

Ultimately, the equipment and in-over-your-head training lends an aspect to the biology teacher's work day that cannot be bestowed by any license or staff development scheme: *Legitimacy*, in a classroom full of street-

wise kids is something that tuition doesn't cover. They see right through the veil of "boot-leg" demos we conceive as easily as munchkins with an inside scoop on the booming, smoky Wizard of Oz. They daily pay close attention to that man behind the curtain. A teacher who can introduce an entire class of reading and math challenged youngsters to real scientific equipment will have no trouble finding an intellectual way home with them; and there's no place like it. They read and write just to keep up with the opportunity to share in a research experience that neither the teacher nor themselves know the outcome.

"Along with the need for newer and more high-tech equipment, schools also need teachers trained in using such equipment and in adapting it into classroom activities. The need becomes especially pressing as teacher retirement incentives diminish the number of adequately prepared teachers.

"Project STIR arranges numerous workshops given by highly experienced colleagues, industry representatives and members of university faculties. Additionally, the Project has sponsored single as well as multiple-day visits to industrial and municipal laboratories. In meeting with industry representatives and members of university faculties, teachers learn how scientific principles are applied in the world beyond the classroom. Stipends have been established for intensive, on-site training of teachers who spend seven to eight weeks in the summer attending internship programs in nearby chemical and pharmaceutical industrial laboratories."

Readers of this article are encouraged to visit the S.T.I.R. Project website:

http://www.projectstir.com

In the event that a teacher chooses to take advantage of the equipment clearinghouse, the teacher is responsible for picking up the equipment, if a connection is made. Project S.T.I.R. does not maintain a warehouse, due to the prohibitive costs of doing so in a large urban center such as New York.

The maintenance of high-tech items is the responsibility of the teacher or school to which the equipment was transported. However, the Project can be of assistance, in such matters as helping to locate low-cost repair companies, finding discounts on parts, searching for donates parts, asking the donor for serial numbers, operation manuals, etc. In one case, the Hewlett Packard company framed repair and training with its donation.

As is also the case with such organizations as the Rockefeller University's Science Teacher Outreach, Columbia's program, or NYU's R.A.I.S., the recipient of these benefits becomes a career-long member of a club of concerned educators who cross paths at conferences, workshops and professional associations. This aspect of participation alone is worth the effort. It turns out to be one of the only "honest" meeting grounds for teachers who truly love their craft and are willing to share techniques and tips. Adele Kupfer is herself an accidental member of a somewhat rarified body of successful non-profit grant writers in the NYC area that includes Bonnie Kaiser, Malka Moscona and Jay Dubner, among others. They are all extremely astute individuals with big hearts and wits to match. We can count ourselves lucky that they are

out there among the folks that have found themselves a life style in teacher support. Many of the other mechanisms for support carry a price tag – be it monetary or bureaucratic. Quite simply, the more ingenious the grant support, the more it approximates a real solution for the teacher. Standardization of curricula, fads in lesson planning and systematic reforms have come and gone within the City schools, yet their developmental focus has not relied entirely on these internal mandates. They are successful primarily in their attention to the need for realistic science experience for teachers, and the means to accomplish it.

Here is a list f some of the workshops that were offered in the past several years by Project STIR of CUNY:

**DNA Technology: DNA Profiling in the Courtroom (2000)*

**Using Computers and Probes in Hands-on Chemistry Labs (2000)*

**The Biology and Chemistry Behind the Biosphere (2000)*

**Designing and Implementing Lab Activities According to the New Standards (1999)*

**Discussion on City Water Treatment by Consolidated Edison (1999)*

**Using Computer Based Graphing Calculators in the Laboratory*

**Saturday Workshop on Ion Chromatography (1999)*

**Teaching Science & Technology with the NY Times (2001)*

**Teaching Physics through Astronomy (2001)*

Last month, STIR hosted another DNA profiling workshop at the Weill Medical College of Cornell, and this month (November) on the 7th, teachers were treated to WNET/Channel 13 video-on-demand service at the WNET station on 33rd Street.

In April of this year, STIR threw an *Environmental Science Weekend at Polytechnic: Living an Breathing in New York City*. The workshops in this all-day activity included the biology, physics & chemistry of water, and using sensor probes to teach environmental science.

Future workshops include:

**Using Computers and Probes in Hands-on Chemistry Labs* (11/16/03) at NYU

**Teaching Science & Technology with the NY Time*s (11/21) at the CUNY Graduate Center

* *Designing and Implementing Lab Activities – Summary discussion of NY State Regents for Biology, Chemistry & Physics*, (12/12/03) at the CUNY Graduate Center

Readers are again encouraged to visit the STIR site, and keep an eye open for summer institutes as well. A recent *Laboratory Technology and Classroom Activities Institute* included DNA work, chemistry & geology for environmental science, synthesizing an organic compound and electron microscopy. These also include a CUNY orientation and follow-up sessions, from September through May, for which teachers receive a stipend.

ADAPTATION

Dear Advertising Division:

ADAPTATION is a publication of the New York Biology Teachers Association. Its distribution includes:

- members of the Association
- science department supervisors of junior and senior high schools of New York City public, private and parochial schools
- private, public and parochial schools of Westchester and Nassau Counties
- biology departments of New York City's two- and four- year colleges
- participants in the Annual Convention of the Science Council of New York City (S.C.O.N.Y.C.)

The New York Biology Teachers Association invites you to place ads in ADAPTATION on an issue-by-issue basis. Ad artwork and form should be sent **"copy size ready**". Please note the current rates:

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Payments should me made payable to the New York Biology Teachers Association, and may be made for up to four issues in advance. Send payment, ad copy and bottom form to:

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Brooklyn Technical High School
29 Fort Greene Place, Room 2S12B
Brooklyn, NY 11217

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IF YOU CAN'T FIND YOUR FACE IN THESE CROWDS, YOU MISSED THE LAST LIVING ENVIRONMENT WORKSHOP. DON'T MISS THE NEXT ONE! IT'S ON SATURDAY, NOVEMBER 15 2003

Announcing
The
58th OTTO P. BURGDORF
ANNUAL STUDENT SCIENCE RESEARCH COMPETITION

The NYBTA is proud to sponsor the 58th Annual Otto P. Burgdorf Student Science Research Conference. The goal of the conference is to offer guidance and motivation to the many young people attending. It is our hope that the Research Competition finalists will serve as positive role models for other aspiring research students. Our Student Finalists will present their research posters and convey the rich variety of experiences they had while pursuing their work. It has been our experience that the enthusiasm and attitude of these Finalists is quite contagious. Only the categories on the application form will be accepted.

Please see below for Project Eligibility and submission of papers. ALL SCHOOLS SUBMITTING PAPERS ARE REQUIRED TO PROVIDE AT LEAST ONE JUDGE. SCHOOLS ENTERING MORE THAN 5 PAPERS MUST SUBMIT ONE JUDGE FOR EVERY 5 PAPERS.

RESEARCH PROJECT COMPETITION AND ELIGIBILITY
The Research Project Competition is open to students enrolled in grades 9 through 12 in public, private, and parochial schools. **STUDENTS MUST BE SPONSORED BY A 2004 MEMBER OF THE NEW YORK BIOLOGY TEACHERS' ASSOCIATION.** Eligible papers are independent experimental research carried out by students under the direction of the advisor. TEAM PROJECTS ARE NOT ELIGIBLE. Competition registration forms, properly completed, must be received by the NYBTA with 3 copies of the research papers by December 3, 2003. The format rules, including the endorsement by an advisor, must be strictly adhered to. The decisions of the judges will be final on all matters of eligibility.
(NOTE: IN PREVIOUS YEARS MANY PAPERS WERE DISQUALIFIED ON TECHNICALITIES. PLEASE READ FORMAT RULES CAREFULLY!!!)

Research papers submitted will be considered by panels of judges. Thirty finalists will be selected from all the papers submitted, on the basis of their written papers. To broaden representation of schools in this pool, there will be a limit of three finalists and three honorable mentions per school. Schools are encouraged to enter all their eligible papers so as to increase their chances of obtaining finalists. All finalists will present their papers at the Otto Burgdorf Conference in late April. The exact date will be announced later.

VERTEBRATE QUALIFICATIONS and HUMAN SUBJECTS
Projects that involve living vertebrates or products from these organisms are not eligible unless accompanied by a letter from a professional research scientists stating that the work was supervised by a research scientist; that the student was not actually involved in obtaining tissue or cell cultures from living organisms, that the student was not involved

in the sacrificing of experimental animals. If the project involved the use of human subjects, permission forms should be included with the paper. Letters and materials submitted for the Intel Science Talent Search or International Science and Engineering Fair will satisfactorily fulfill the Burgdorf requirements. Once again, the decision of the judges will be final.

GENERAL JUDGING CRITERIA

Finalists will be chosen on the basis of the scientific quality and merit of their papers. Criteria include: 1) was the research done by the student; 2) how original was the research; and 3) how clearly is the work presented.

FORMAT RULES

The research paper should contain:

- a short title that is easy to understand;
- background information on the topic being researched;
- a description of the methods and techniques that were used;
- statement of the results with appropriate data;
- an analysis and interpretation of the results;
- a bibliography of journals and texts used in the work; and
- the name of the student and identifying information absent from all but the entry form.

Illustrations, graphs, etc., if included, should lend themselves into being made into visual aids for an audience and must be properly referenced. The writing style should be clear and concise. The paper should be double-spaced and typed on a single side of 81/2 X 11 inch paper. Papers should be no less than 5 and no more than 20 pages in length. Please make sure that all acknowledgments are removed from the body of the paper.

The cover page should include only the title of the paper. No other school or personal identification should appear anywhere on the submitted paper. School and personal identification should appear only on the Registration Form which should be firmly attached to the title page of one copy of the paper. Remember to remove names from the top of papers submitted to other competitions. Three (3) copies (clear photocopies are acceptable) must be submitted. Authors should keep at least one copy for their files. Submitted papers will not be returned. Students may enter papers they have submitted to other competitions. Scores will be returned to the submitting NYBTA member.

A signed statement by the teacher or project advisor, certifying that the student has actually performed the research under the advisor's supervision, must be included. The name, position, address and phone number of the advisor must be included on the official form. A photocopy of the statement submitted to the Intel STS is acceptable. In addition, a statement guaranteeing the attendance of the entrant at the conference, if selected as a finalist, must be signed.

THE 3 COPIES OF THE PAPER, THE APPLICATION FORM AND THE CERTIFICATION FORM MUST BE RECEIVED NO LATER THAN DECEMBER 3, 2003. (Visit our Web site, http://www.nybta.org)

ADAPTATION

A PUBLICATION OF THE NEW YORK BIOLOGY TEACHERS ASSOCIATION

CONTENTS, Volume 24 Fall 2003

page 3 NABT Affiliates Corner
page 5 Adaptive Mutation
page 8 Endangered Subject: Elementary Science Education
page 11 MABT: Good Web Sites for Biology Teachers
page 12 Bio Blitz!
page 14 A Miocene Treasure
page 16 Is There Life After Teaching? (Continuing Saga)
page 21 Stealth Creationism
page 25 Basic Skills in Science
page 29 NY's Salt Marshes: Eco-Gems in the Rough
page 33 Recent Advances In Science
page 35 A Day at the Beach
page 37 Science Teachers in Industry and Research
page 42 Otto Burgdorf Competition Anouncement

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