



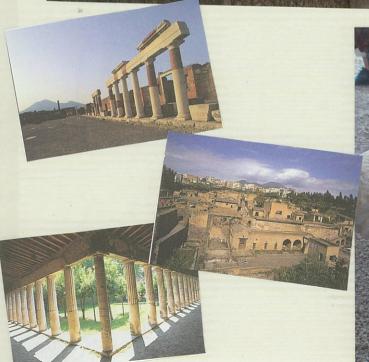






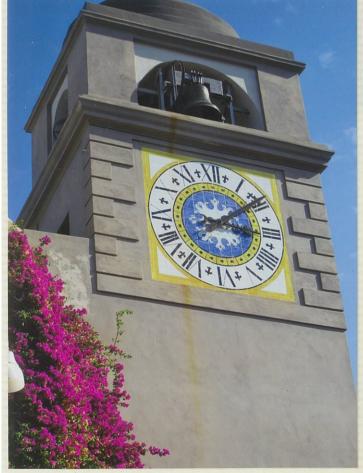


Pompeii Mavesuvius erupts 79 AD

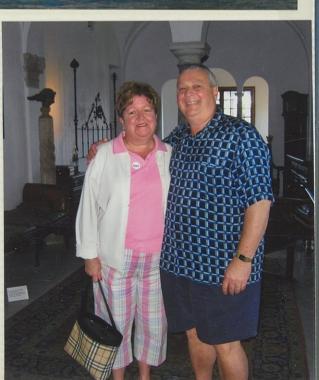






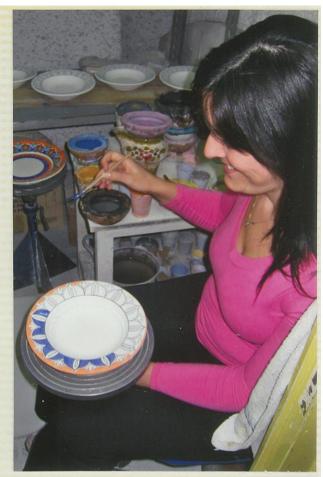




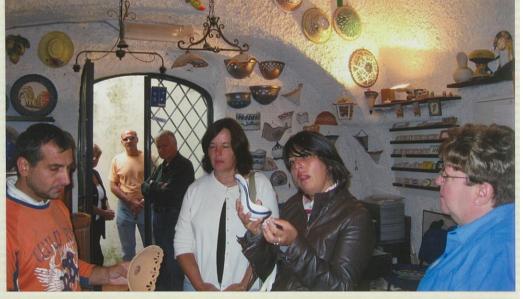










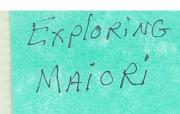






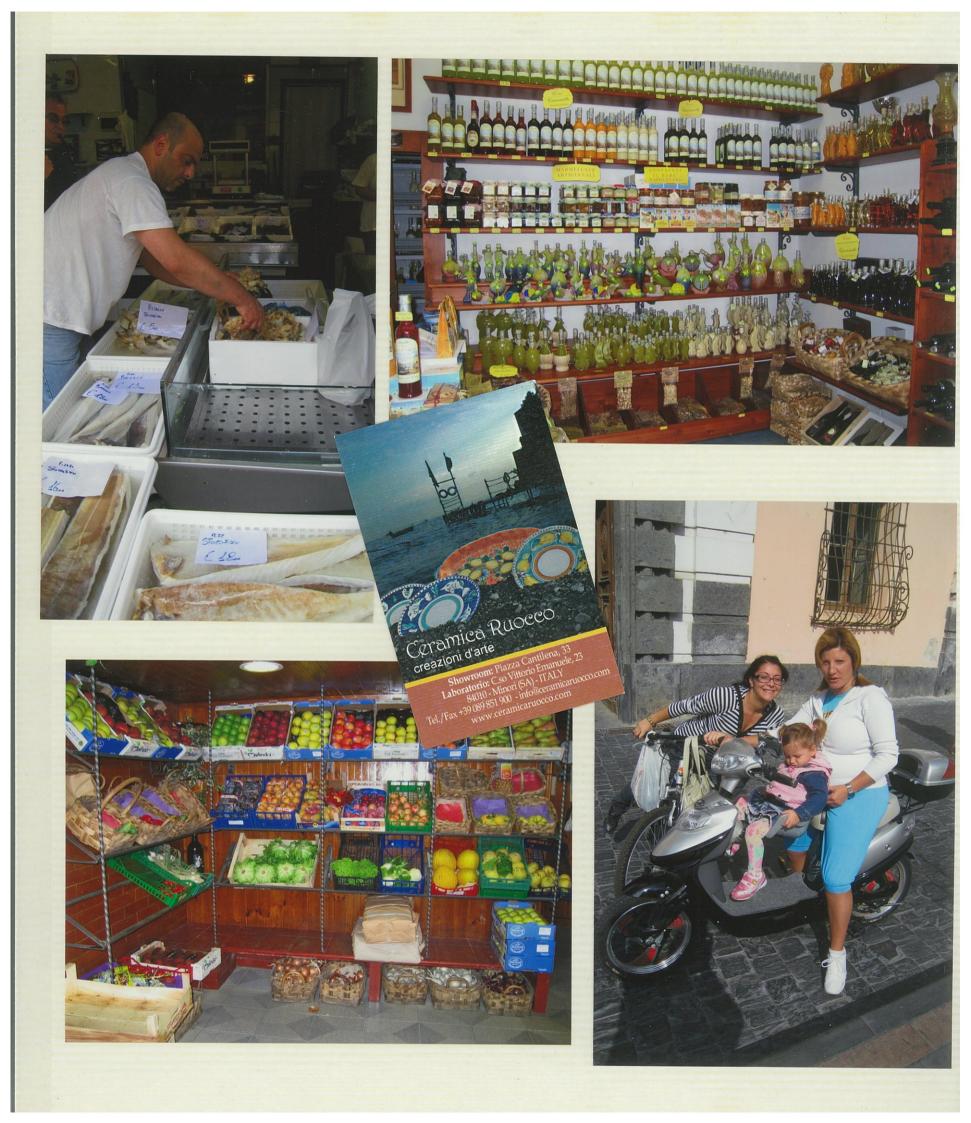






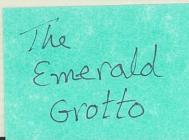


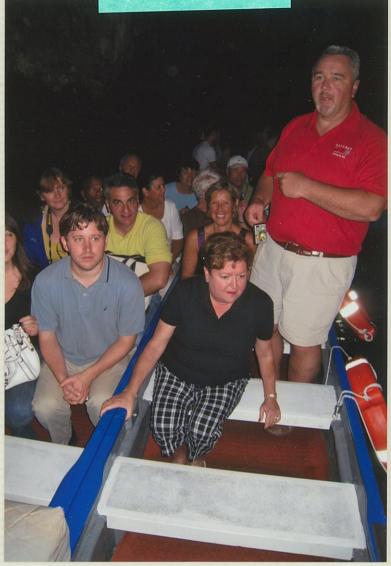














A.A.S.T. - Amalfi

Serie 28/Ord.

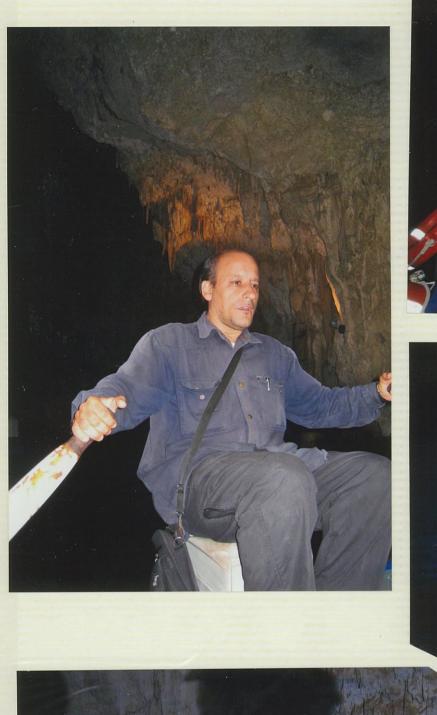
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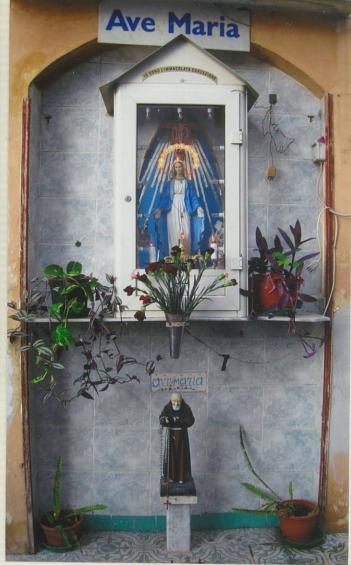


Ente per il Patrimonio Artistico-Mo

"Museo del Duomo" € 2,00 da IVA - Art. 10 - D.PR. 26-10-72 n 633 e succ. mod.











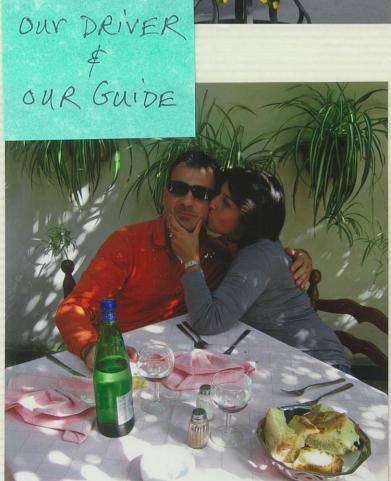








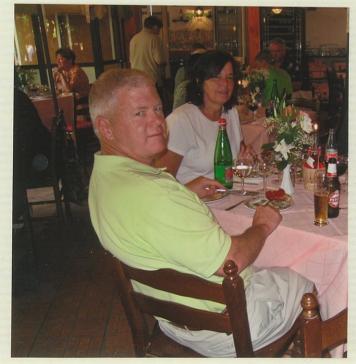








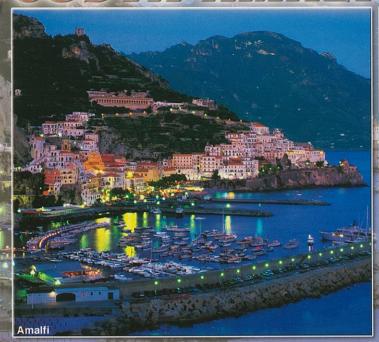








## COSTA AMALFITANA

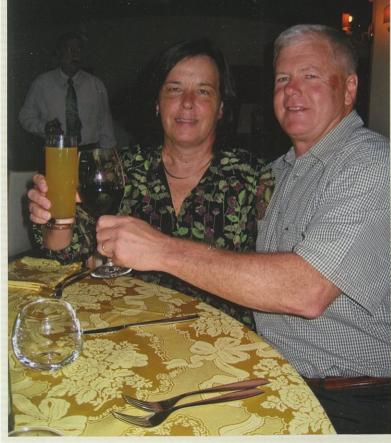


















CARTA D'IMBARCO / BOARDING PASS

CARTA D'IMBARCO / BOARDING PASSENCER

REMANS

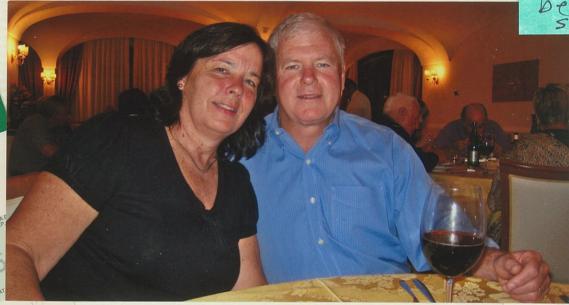
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> November 9, 2008 8:30 &11:15 Services



MICHAEL'S BAPTISM Nov. 9, 2008

Prelude

At he Name of Jesus

Procession-1'

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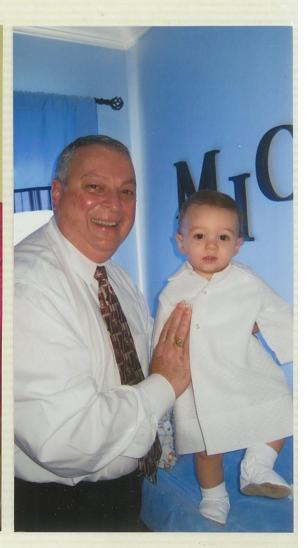










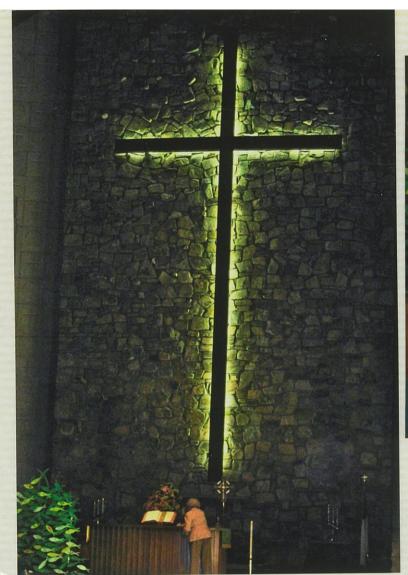






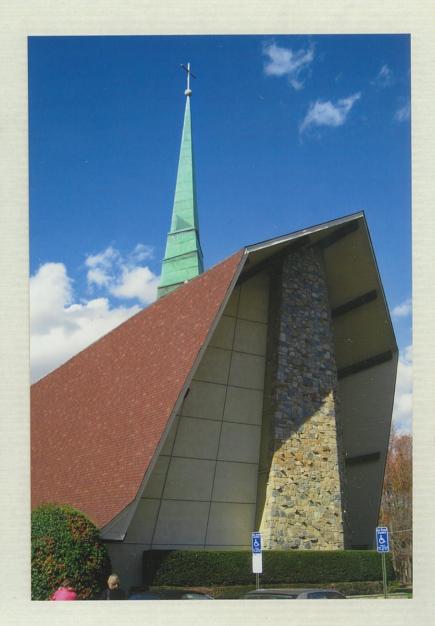


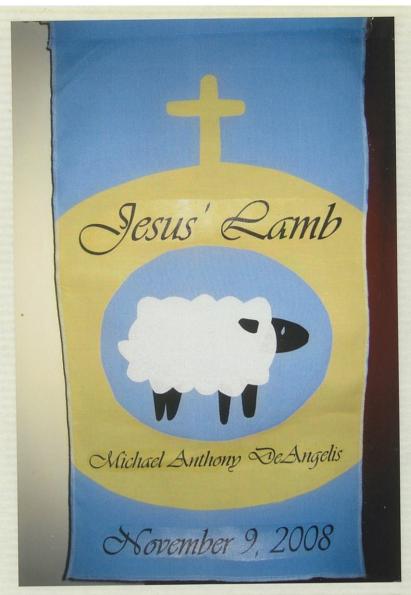






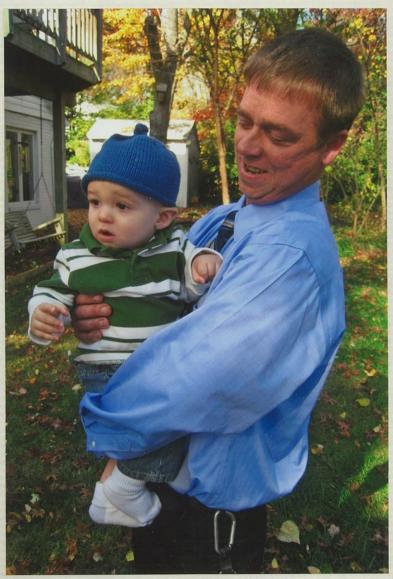






































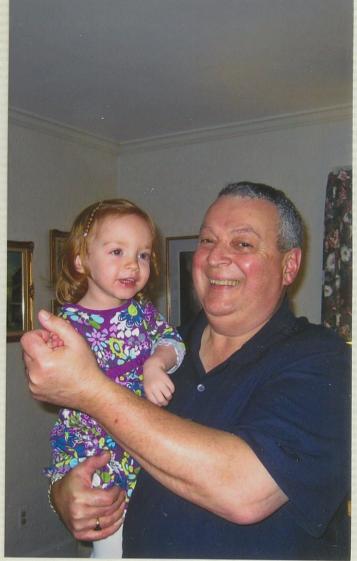




























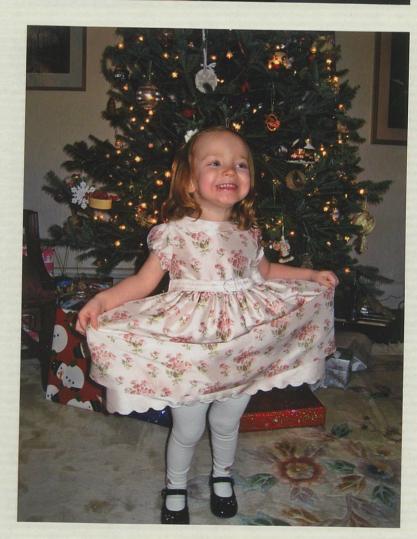
















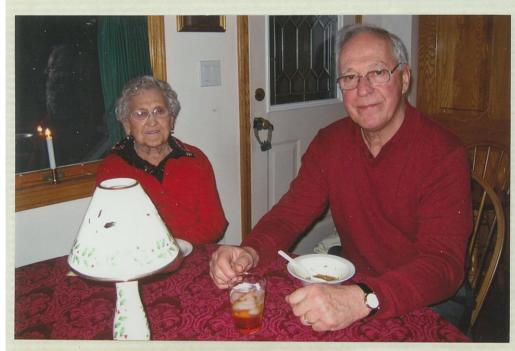






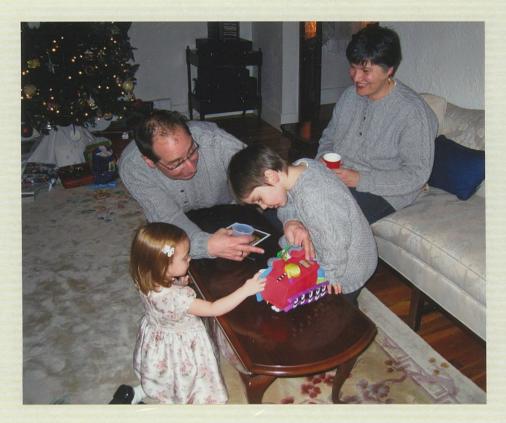






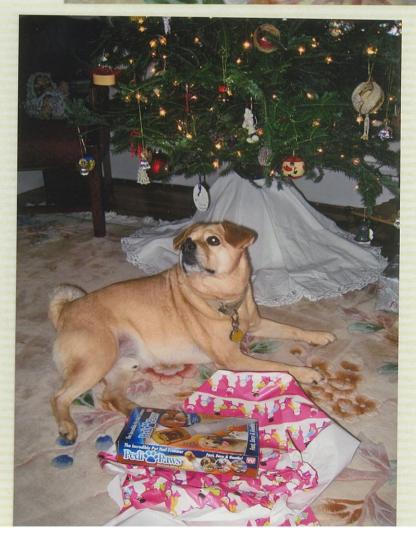












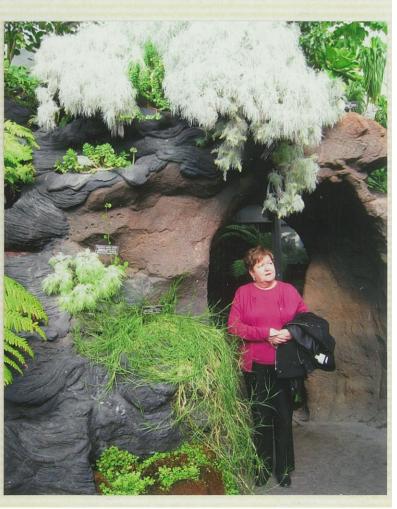


















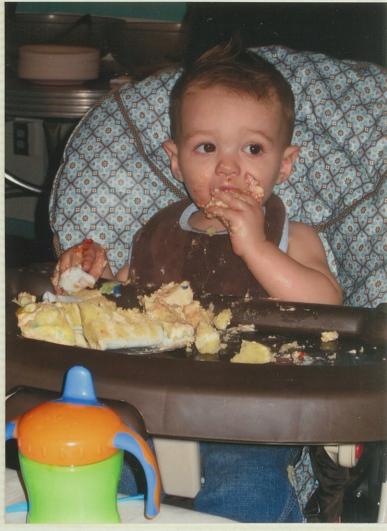
















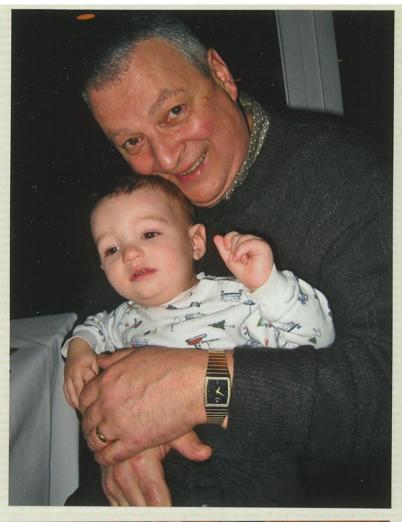


















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April 22, 2009

## **Rainforests Hold Clues for More Efficient Biofuel Production**

Media contact: Dan Krotz, (510) 486-4019, dakrotz@lbl.gov

One of the most efficient biomass break-down engines on Earth is found in the soil of rainforests. Harnessing the microbes' power could lead to improved ways of converting plant material into biofuels.

In September 1989, Hurricane Hugo slammed into the east coast of Puerto Rico with winds exceeding 140 m.p.h. The storm uprooted trees and underbrush, leveling wide swaths of the Luquillo Experimental Forest, which has been a center of tropical forestry research for nearly a century.

Just four years later, however, there were no signs of devastation. Instead of a graveyard of decaying trees, only a thin layer of leaves carpeted the forest floor. Acres of fallen biomass were replaced by a healthy rainforest.



All that biomass, and the rainforest floor is coated by a thin layer of dead leaves. The microbes responsible for this Herculean decomposition task could help usher in a new era of cleaner energy sources. (image: Kristen DeAngelis)



Rainforests Hold Clues for More Efficient Biofuel Production « Berkeley Lab News Center

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says DeAngelis.

Tropical forest soils are also among the oldest on Earth. The microbial communities in Luquillo's soil have had between 40 and 60 million years of evolutionary selection to optimize the rapid and complete decomposition of plant material. Nothing is left behind.

To better understand this hidden world, DeAngelis and colleagues have buried mesh bags filled with switch grass — a promising biofuels feedstock — at several sites throughout Luquillo. Some bags are buried at high elevation sites that are wet and cool. Others are buried at low elevation sites that are warmer and receive less rain (three meters per year instead of five meters per year). Analyses of these samples will help scientists determine the environmental factors that control decomposition rates. The bags of switch grass also serve as "microbe traps," which enable the scientists to conduct a census of the microbes that break down biomass, as well as identify the most efficient bacteria and fungi.

Among the tools used in this research is the Phylochip, a matchbox-sized microarray developed at Berkeley Lab that can quickly detect the presence of up to 9,000 species of microbes in specially prepared samples. The team also developed a similar tool, called the MycoChip, which can rapidly identify more than 11,000 fungal taxa.



The research team in the rainforest. From left: Kristen DeAngelis, Julian Fortney of Berkeley Lab's Earth Sciences Division, and Whendee Silver of UC Berkeley.

In other work, scientists at Berkeley Lab are incubating switch grass and soil communities taken from Luquillo under different conditions, such as with and without oxygen. This allows the team to home in on the parameters that best drive biomass decomposition.

The scientists are also amassing inventories of the genes in Luquillo's microbial communities, which will help them pinpoint the enzymes responsible for breaking down lignocellulose. This work is conducted at the Department of Energy's Joint Genome Institute, which carries out sequencing projects that accelerate research in energy, agriculture and carbon sequestration.

"Tropical forest soils could serve as a reservoir for new biomass-decomposing microorganisms — and we're starting to identify the key microbes and enzymes," says DeAngelis.









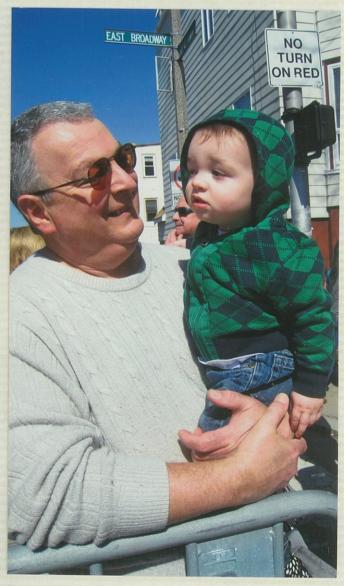














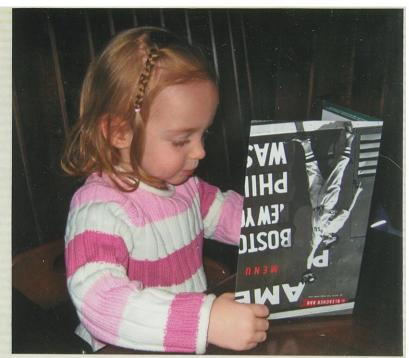








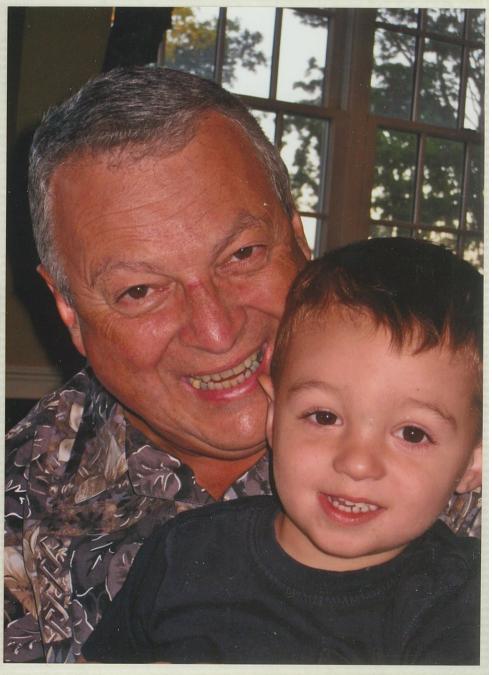




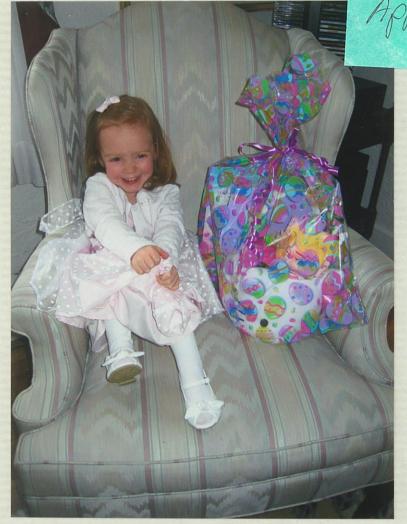
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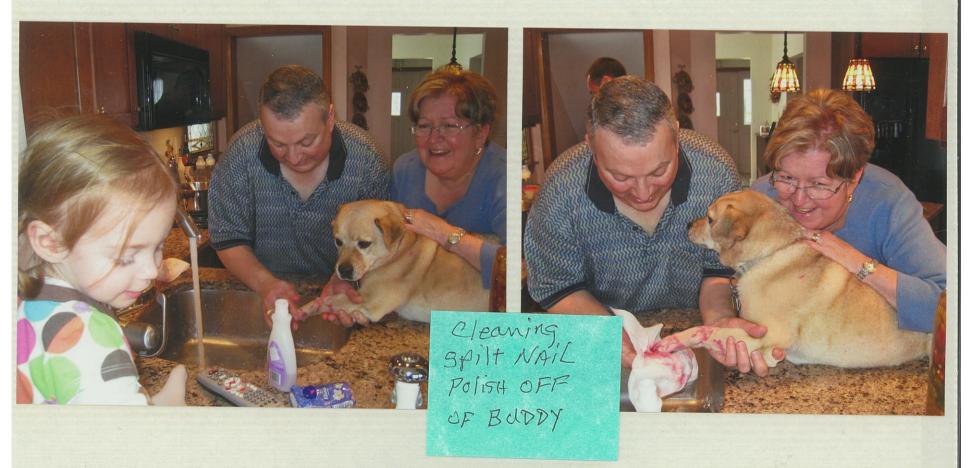




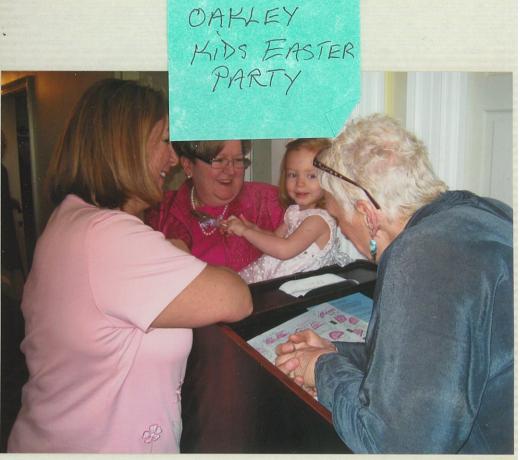
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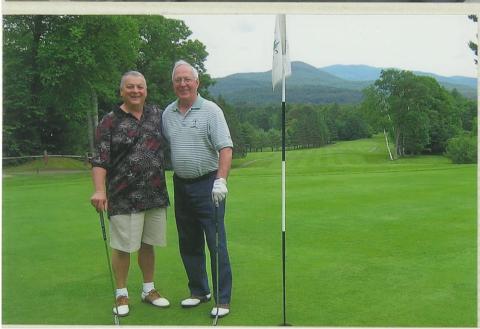


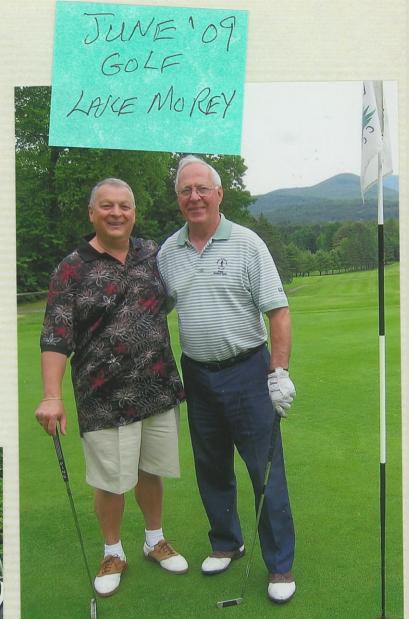


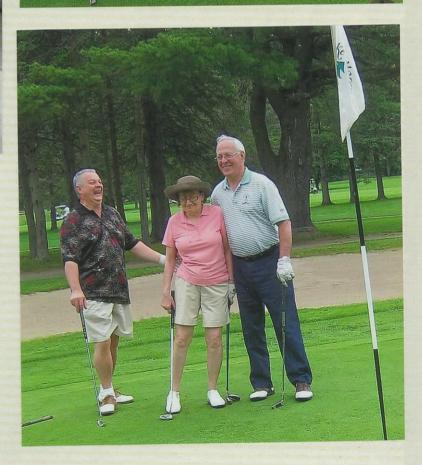








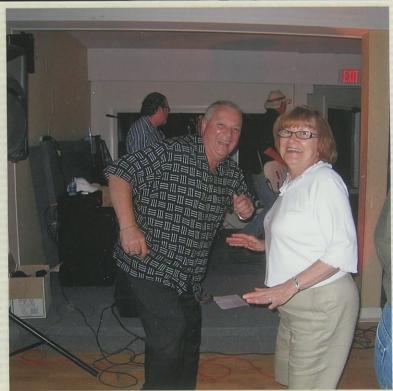














## July '09 ButtERMILK BAY





