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RESTORATION OF TRADITIONAL KNOWLEDGE TO ENHANCE SELF-SUFFICIENCY[1]

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The current state of rapidly diminishing high-demand resources such as fossil fuels and the concomitant disruption to the global economy is affecting current lifestyle standards on Pacific Islands. Fuel costs are rising, gas rationing is becoming more frequent, intervals between the scheduled arrivals of container ships are increasing, and the strategic need to reserve fuel supplies for power generation is becoming imperative. How can the Pacific Islands wean themselves from their dependence on fossil fuels, yet assert their independence, maintain or increase current living standards, establish fully functioning economies that need limited or no outside support or intervention, and at the same time preserve and conserve their culture? Presented here is an outline of one possible solution: reviving and revitalizing traditional skills, but with the added intent to modify, accommodate and integrate modern materials and tools. Traditional skills related to sailing, fishing, gardening, and power generation are discussed. Observations from the archaeological record are included, as evidence for long-term solutions in accommodating environmental perturbations (including man-made modifications to the environment) that are visible in the material remains. As the archives of traditional knowledge, historic and cultural preservation offices are in a unique position to spearhead a traditional skills restoration program.

This is essentially an essay intent on reviewing the current state of historic preservation in the western Pacific, as a stepping-stone toward developing a model of localized self-sufficiency that draws upon the store of cultural memories and heritage practices. Many of the Symposium presentations focused on the importance and the mechanics of preserving, documenting, archiving, and charting the transformation of tradition and heritage—what has been done in the past, what is being done now, and what is still to come, i.e., the future of historic and cultural preservation and management. Culture, as we are all aware, is not static. The archaeological record across Micronesia demonstrates this fact quite well—architectural styles change, as does material culture, settlement patterns, burial arrangements, even the rise and fall and transformation of power- and administrative centers. But, our familiarity with the dynamic quality of culture is probably most recognizable in the visible changes we see in more recent (ethnographic and historic) material culture, oral histories, and those intangibles of culture such as chants and dances. Not only are these changes visible, they are tactile—we can see them, feel them, even hear them in the spoken word. Why, any glance at historical documents, navigators' logs, diaries, letters, reminiscences, and even eyewitness accounts of historical events will reinforce the reality of this change, in the event we weren't quite sure of our own senses.

But, this change has not occurred in a vacuum. As cultures across the region have manifested some form of change, whether in-

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ternally (e.g., internecine conflict, political alliances, innovation, knowledge transfer) or in response to some outside stimuli (e.g., inter-island rivalries, expansion of trans-regional exchange networks, the visit of a western explorer, arrival of a missionary, intrusion of foreign governments and establishment of colonial outposts), the world has undergone its own kind of change. Today, that change is rooted in a race to control resources of all kinds, including water, oil, and various strategic minerals. This is a race with ominous undertones, particularly as we (as a global entity) are now facing increasingly and rapidly diminishing resources, in particular and especially what are now considered the strategic resources of fossil fuels. Let's face it, the foundation of our global economy has been built on the false assumption that we will have a secure and consistent supply of fossil fuels forever. Recent events, however, have managed to quash that assumption.

What does the growing demand on the diminishing supply of fossil fuels have to do with historic and cultural preservation? Actually, everything. In the succeeding pages, I will attempt to explain why this is so and where the offices of cultural and historic preservation stand in light of the current state of our world.

Historic preservation offices are the keepers of tradition, the archives of culture. It is up to them to document and preserve both tangible and intangible cultural acts as thoroughly as possible. Funding for such laudable goals, however, is subject to other priorities—economic development, maintenance and improvement of infrastructures, heath, security, and education needs. Anything beyond these most critical needs of a country are often the first items to be slashed from a budget. Further, news reports, scientific articles and industry white papers issued over the last year have introduced another, more insidious cost to national budgets—the cost of fuels. Formerly negotiated fuel contracts are having to be renegotiated across the region owing to the skyrocketing cost of fuel as well as its delivery. Sometimes, this negotiation is taking place at a critical juncture—just prior to the planned delivery of a tanker, as the island is running low on its supplies.

CURRENT GLOBAL CONDITIONS

By all accounts, the world reached "peak oil" at the end of November 2005, on what we traditionally call Thanksgiving Day in the United States (Deffeyes 2001). This is presumably when we reached the limits of reasonable economic extraction and production of fossil fuels—the end of the sweet crude, in other words. From this point forward, the extraction of sour crude (dirty oil) becomes the focus of the oil industry, but it also involves a process that is more costly overall (Hubbert 1974, Nur 2006). This requires, in essence, paying more for less when it comes to fossil fuels, accompanied by the other consequences of diminishing production as it influences economies everywhere—at least those economies where oil serves as the foundation for business, industry and governments (Abbott et al. 2006, Whipple 2006).

This has in turn led to:

- Fuel shortages across the world, with global divisions and competition among economic powers for an increasingly limited supply of fossil fuels (Clemence 2006, Hubbert 1974, Miller and Diamond 2006);
- An evolving world of economic and industrial haves and have-nots, with the least powerful among the have-nots (Miller and Diamond 2006, Guerrero and Waters 2006). On the global stage, the Pacific Islands (and most notably, Micronesia) generally fall into the latter category. They are positioned at the end of the supply line—gas rationing, power rationing, supply ships arriving at more extended intervals, frozen and chill foods and imported goods in short or limited supply (Cohen 2006, Donato 2005, Economic and Social Survey 2006);
- Increasing costs of moving commodities over long distances, with those costs passed onto the consumer (Hubbert 1974);
- A shift in the categorization of fossil fuels as strategic resources where the defensive arm of national governments receive priority over the commercial and industrial

sectors, with the consumer relegated to the end-of-the-line (Fenderson and Anderson 2006);

- A greater percentage of income, profit and national budgets directed toward the purchase of fossil fuels, which in turn leaves an increasingly diminishing pot of funds for all those activities and undertakings not considered fundamental to the support of an economy (mainly, strategic services, defense, security, utilities, and so on). Cultural events and activities tend to be among the first items to be cut from any budget (Cobb 2006). For those nations funding cultural programs outside their own borders (e.g., US, Japan, Australia, EU), this is a judgment call on the part of funding nations that see little need to protect, preserve or conserve another's heritage, which to them resides in some far-off, shadowy land that is unattainable, unreachable and for all intents and purposes, confined to an abstract and distant memory (Donato 2005). The arts, heritage preservation, the intangibles that define a culture are relegated to the lowest tiers of need in prioritized budgets—they have usually been the recipients of excess money, but are never seen as having the same needs for funding and support as other so-called fundamental elements in an economy.

Ancillary to this is the growing global population, with more people wanting more things. The press of population on the world's resources, oil first among them, is one of those factors driving the cost and availability of fuel supplies. But nothing lasts forever; resources are not limitless, they are finite. Today, we are witness to the dwindling supply of fossil fuels, but tomorrow, it will be other commodities. Tucked into the back pages of newspapers around the world are stories about the growing scarcity of precious metals such as gold, silver, copper, and zinc, as well as water and other resources that serve as a backbone to industry (Global clean water 2006, Keating and Passell 2005).

FUEL USE ON ISLANDS

In the islands, fuel is used for fishing, for power, for generally getting around; so much of everything is predicated on fuel use, including the delivery of imported goods and even tourists (Cohen 2006)! But what happened during the summer of 2005 on Kosrae continues to happen at irregular intervals throughout the region—islands are held hostage to fuel suppliers who are in turn facing increasing wholesale costs for fuel as well as increased costs for actually delivering that fuel. The relatively small supplies required by the various island states across the region receive low priority in lieu of larger buyers who require larger supplies (it becomes a question of profit). This lowered position in the supply system leads to limited amounts of fuel available for on-island use (Johnson 2005, Pareti 2005, Economic and Social Survey 2006, Hezel and Lightfoot 2005) which leads to rationing determined by strategic need (in such a system, households tend to be consigned to the lower levels of priority, with security, utilities and health among the higher priorities of need).

In 2005 Kosraean families were allotted two gallons of fuel a week per household, while government offices received the more generous amount of three gallons of fuel per week. On the face of it, that doesn't sound so bad; Kosrae is a small island with a small population confined to villages located on its narrow fringing coastal plain. But, when you begin to consider how much fuel is consumed to go fishing for a family's subsistence, to go to work, to do the work required of a government, to conduct the routine business of an historic preservation office, only then does the true dependence on fossil fuels become apparent. For the brief period of time I was on the island during that year, people were grumbling about how they wished they hadn't lost their traditional skills, how they could use them now, particularly as the supply ship was late, and fuel was increasing in price and becoming scarcer.

So, how can Kosrae, and by extension, all other islands in the region experiencing the same pressures and the same shortages wean themselves from their dependence on fossil fuels while at the same time assert their inde-

pendence, maintain or even increase current lifestyle standards, and conserve their culture?

ALTERNATIVE ENERGY SUPPLIES

First, a slight diversion into the realm of alternative and sustainable energy supplies, i.e. green, environmentally sound energy systems. We are now seeing a more intensive effort in the development of clean energy systems based on the sun (solar energy), wind, tides, ocean temperature differentials, biofuels, geothermal production (from large community to now household systems), and a combination solar energy fueling sterling engines, to name a few (Compact tidal generator 2006, Dworsky 2006, Europe sets up task force 2006, Report: biofuels 2006, Tenenbaum 2006, www.hubbertpeak.com/deffeyes, www.seasolarpower.com). Unfortunately, none of these alternative energy sources are adequately or fully developed for any kind of large-scale, efficient or economic use; for the moment, each requires a significantly greater amount of research attention and funding. Some are currently operable, but for limited periods of time; however, they tend to be inefficient, rife with energy leakages, and contribute a percentage of the potential energy needed to run a community or a household. In short, they represent a small step off the fossil fuel energy grid, but are not sufficient to eliminate our demands for fossil fuels.

What can island economies do? How do they fit into this scheme of alternative energy sources, yet bring forth their own kind of independence of identity and culture? Throughout the Pacific, albeit sporadic, there is a push to buy locally produced commodities (Abbott et al. 2006, Huff 2006). There is also a movement—and, here the west is actually taking its cue from the islands!—called Sailing for Sustainability, which represents a shift away from motor powered boats to sailing vessels, with a number of boat owners actually converting their boats to sail powered boats (Castle 2005, www.footprintnetwork.org). There is even a move afoot toward manufacturing solar powered boats (Leahy 2005).

And in true island fashion, we are seeing the use of coconut oil as an additive to diesel, along with the production of biofuels from a range of plant wastes and other local innovations (Coconut oil 2006, Fiji chemists 2006, Niue, Greenpeace 2005). Though not in Micronesia, Japan is looking at the temperature differentials in seawater as a way of producing energy (Shimbun 2006), while other island and coastal states are looking at tidal farms, geothermal possibilities, and so on. Around the world, we are seeing a growing market in the production of items that require no traditional kinds of fuel cells or electrical connections for power (Solar cooker 2005)—wind-up flashlights and radios, pedal power generators and air compressors, the more frequent use of LEDs (light emitting diodes—no bulbs, just the translation of a small electrical current into visible light by conduction. It has been estimated that replacing all the traffic lights in the US with LED signals would save almost 2.5 billion kilowatt hours or roughly $200 million, or 5 billion pounds of CO_2 that would have resulted from burning fossil fuels needed to make electricity to run the lights per year).

Hand-in-hand with the production of alternative energy sources is an increasing discussion of a move toward steady state economies, and a shift away from 19th century capitalism or the economic growth myth about increasing profits through increased productivity (such increases require an expanded use of non-renewable resources, fuel in other words). The myth of economic growth is predicated on a presumption of infinite resources at the service of a continually increasing population coupled with its growing demand for goods and services; consumption is expected to rise in proportion to the growing population, this in turn drives demand, which is supposed to further stimulate economic growth. Under the umbrella of orthodox growth economics, financial prudence demands depleting one resource while at the same time investing short-term earnings into the depletion of some other resource; supply drives demand, which in turn increases investor profit (Daly 1991). However, the reality of this myth is that nothing grows forever, at some point resources, all resources (including those most critical to the a nation's

infrastructure) will be "unexpectedly" exhausted.

As a mediating approach to conserving resources or at least slow their pending exhaustion, some economists and scientists have advocated a shift to steady state economies, or zero growth economies (Daly 1991, Hickerson 2004, Hubbert 1974). These are economies based on a stable no-growth population, a level rate of consumption, a reduction of our ecological footprint, and goals that focus on positive reciprocity. But, how can they insure economic sustainability, national security and political stability in light of the current state of our world with its decreasing resource base and increasing competition over them? The short answer is that we have to develop a different perception of the world, one focused on conservation. But this is getting us away from the topic at hand.

Returning to our original question, how can island economies wean themselves from their dependence on imported fossil fuel and other goods, or at least seriously limit their dependence on imported materials? This is where historic and cultural preservation offices come into play.

THE ROLE OF HISTORIC AND CULTURAL PRESERVATION OFFICES

As keepers of tradition, historic and cultural preservation offices have the knowledge and ability to initiate a revitalization of traditional skills within the local community by mining these skills from oral histories, from those still knowledgeable in the traditional arts, from historical documents, and from the archaeological record. This becomes a kind of proactive community activism with a difference—revitalization of traditional skills with a twist: employing modern materials. Such a revitalization could provide a way to enhance self-esteem, maintain cultural identity, and in terms of energy consumption, make islands more self-sufficient by weaning them from their dependence on foreign, imported fuel and other goods.

Many of the Micronesian historic offices support community workshops in the preservation of crafts, but how many take it one step further? How many encourage the development of a sustainable activity that feeds into the local economy? From a broader perspective, lessons from the past, including artifacts of remote and distant times, could be integrated into local economies. This point was made abundantly clear during an archaeological reconnaissance of an interior drainage on Kosrae when my crew and I came across several abandoned gardens adjacent to historic sites and what turned out to be prehistoric village complexes. The vegetation had since run wild, but among the plants were varieties that were no longer used today yet for which some oral history or local lore still survives; plants described as 'the kind that never die'. The crew became very excited about the discovery and immediately began taking cuttings to transfer to their own gardens.

This singular action, coupled with island-wide complaints about the cost of fuel, the decreasing imports of supplies on-island, the lateness of the supply ship, and the need to train the next generation to take over as leaders in historic preservation (on Kosrae, at least, there has been a real crisis among the youth) prompted the development of possible solution toward self-sufficiency and economic sustainability while still retaining local traditions. The Kosrae historic preservation office has crafted one possible model that could potentially alleviate some of the hardships islands across the region are likely to face in the not-so-distant future.

A MODEL FOR SELF-SUFFICIENCY BASED ON THE RESTORATION OF TRADITIONAL KNOWLEDGE

The baseline for this model is within the purview of local historic and cultural preservation offices, particularly as their archives are more or less equivalent to a central clearinghouse of ancient knowledge, or more to the point a community skills bank rooted in time and tradition. As the lead agencies in this undertaking, the historic offices could potentially oversee the integration of traditional knowledge with modern tools and materials. Their archives provide information on access to knowledgeable people, traditional navigators, craftsmen,

medicine specialists, oral historians and oral testimony of other sorts, historical documents that describe various activities, and even archaeological materials related to these activities.

As this model is focused on the community as a whole, it requires an active acceptance and participation of the community; otherwise, it is doomed to failure. The model is divided into several parts focused on sailing and fishing, gardening, medicine, youth programs, and power generation. Each of these areas could be initiated independent of the others, and each would represent a small step toward self-sufficiency and energy independence as well as a move away from imported goods and services. Together, they could assist an island economy in making that great leap forward into a fully participating, sustainable and contributing member of the regional and global economy.

Traditional skills in sailing techniques

This could mean contracting with traditional navigators to hold workshops on traditional sailing methods, basic information on traditional sailing crafts, and even traditional fishing techniques from these crafts. Boating and sailing are integral to the lifestyle of Micronesians, but it is a lifestyle under threat as it remains dependent on fossil fuels. Yet, for generations, the people of these islands have developed their ocean-going skills to an art that allows them to view the ocean as familiar territory, a place for retrieving food and other goods necessary for survival. Today, few rely on traditional sailing craft, as most boats are motorized. The shift to modern craft has paralleled a concomitant loss of knowledge in these traditional arts. Only a few smaller islands still retain this knowledge, islands such as Satawal and Lamotrek.

A revitalization of traditional sailing techniques could aid in severing ties to fossil fuel dependence and set the stage for more productive communities. The caveat would be to incorporate modern craft into this traditional body of knowledge, modifying these craft in such a way as to make them seaworthy under a regimen of old knowledge. In other words, how can modern craft already in existence be reworked so that they can be sailed much like traditional crafts? The knowledge of traditional navigators (and boat builders) should be adaptable to modern craft. In particular, fishermen need to be integrated into this system, but with the boats they already own—boats that could be adapted to a fuel-less form of propulsion.

This part of the model is not without precedent, as another, somewhat similar program was initiated in the Marshall Islands some thirteen years ago, *Waan Aelon in Majel* (WAM). Originally WAM was intent on documenting all the major designs for outrigger canoes, but gradually the program goals shifted toward a youth oriented vocational and capacity training center. Today, young Marshallese learn the art of traditional canoe building using both modern materials and traditional materials; navigational techniques; adaptation of their skills to modern craft; and other skills like weaving and woodworking (www.wamprogram.org).

Fishing

Fishing, both inside the reef and outside, is a mainstay for many families and the community. In general, fish are supplied by members of the same household or from relatives in extended families. Today, off-shore fishing in particular is heavily reliant on fossil fuels to power boats outside the reef and into the deeper water of the open ocean where schools of pelagic fish are found. This is a dangerous undertaking, as fishermen are subject to the instabilities of the weather as well as the changing conditions of the ocean itself. This coupled with current levels of fuel rationing escalates the danger in an already dangerous occupation. Establishment of community fishing fleets could potentially alleviate some of the immediate problems of fishing today. Initially, it would allow fishermen to pool their fuel allocations.

More than that, however, community fishing fleets could provide a training tool for younger men as well as a venue to demonstrate (from both an historical and practical perspective) traditional fishing knowledge and traditional navigation techniques as they relate to fishing. Among the benefits would be distributing fishing around the community rather than placing it on the shoulders of individual families. When combined with the move to alter

modern craft into pseudo-traditional craft, another benefit would be to hasten the shift toward fuel independence.

Gardening

Current diets across Micronesia rely heavily on rice as a mainstay and supplement to most meals. But it is an imported commodity, and it is one of the foods that is likely contributing to or at least exacerbating the increasing rate of diabetes and high blood pressure (coupled with the consumption of other imported foods, canned meats, sodas, spirits; foods high in sugar and salt contents) (Santora 2006, Diabetes 2006, McLean 2006). As an import, however, rice is dependent on shipping schedules. It used to be grown on Guam, but the current and planned level of development across that island now precludes the diversion of water resources needed to grow enough rice to accommodate the island's population—in other words, rice production may not be feasible on Guam or any of the other Micronesian islands.

Now, however, would be the time to revitalize traditional gardens and the production of traditional foods. Such gardens are a lot of work to maintain, but they also produce a stable food supply that is adapted to local conditions (Bray 2006, Cascio 2006, McCarthy 2004, Tomczak 2005, Whipple 2006). With the establishment or re-establishment of traditional gardens comes the real possibility of reviving older heirloom species of taro (for instance) and other plants. In the industrialized world, heirloom plants are prized in gardens and command higher prices in the markets. But they also contribute to the overall rigor of species by preserving genetic diversity and inhibiting vulnerability to insect damage and disease (Crawford 2005, Doomsday vault 2006, Huggler 2005, Maize 2006, Plant DNA 2004). In a traditional society, heirloom species also provide a link to the past and become mnemonic devices for the retelling of oral histories. One possible source of heirloom plants is the archaeological sites of the region, which often contain remnants of older plant varieties. On Kosrae, for instance, members of my crew immediately recognized the plants in long abandoned gardens as 'the kind that never die but which are no longer grown in local gardens because they have been forgotten'.

Such a revitalization of heirloom species could actually lead to traditional or heirloom foods markets, particularly as not every one is able to work a traditional garden today given the demands of the modern work-a-day world. This could become another new sector in the economy. Today, there are a few small stores with limited traditional foods, but an heirloom food industry could become something more, something similar to or at least modeled after Yano's Market in Palau (which started as a small family store and grew into a larger market with the increased demands for fresh foods, especially traditional foods).

Linked to heirloom or traditional gardens could be an introduction or revitalization of chicken species that do well on an island and which in turn produce both eggs and meat.

Also directly linked to a localized, cooperative food industry predicated on the production of traditional species could be an education campaign directed toward eating healthy by reviving a traditional diet.

Medicine

Traditional medicine is one area where local knowledge is imperative to record. Whether that knowledge is put into practice or not is another matter; however, given the increasingly sporadic delivery of imported goods (including medicines), it may prove beneficial to have a working knowledge of this ancient art on-island if only for emergency services.

There is a lot of knowledge about traditional medicines in many indigenous communities around the world. Today, this knowledge is under threat from the west—with a move to find more effective treatments for a variety of ailments, western pharmaceutical companies are more frequently laying claim to traditional remedies, filing patents, and locking up the intellectual property rights of a local community. Even more insidious, these same companies file suit for patent infringement when a local community then uses this same medicine now 'owned' by the western company. One may be prompted to ask how it is possible to patent something that is known (part of the public re-

cord of oral history) and has been passed from one generation to the next. Patent law is a curious field, particularly as it is produced, written and developed for wealthy nations. In essence, it is predicated on the existence of written and published materials, not oral history; if a written document can be produced that demonstrates the targeted knowledge is commonplace and generally accepted by the community, it is not subject to patent. But, if there is no written record, if the record is oral, western courts will frequently issue a patent (Backyard garden 2005, Biswas 2005, Carrell 2005, Easton 2002, Field 2005, Hamilton 2003, Healing powers 2003, India wins landmark 2005, Integrating Intellectual Property Rights 2002, Janke 1998, Lancaster 2006, Motluk 2004, Parry 2005, Pearson 2003, Ryan 2002, Sage herb 2003, San people 2001, Scientists turn to sage 2003, Selva 2004, sunsite.wits.ac.za/izangoma/part3.asp).

In terms of using historic information and the realm of medicine, simply the act of recording and documenting the plants, uses, practices, and conditions of use contributes to the maintenance of cultural knowledge. Taking this just one step further, why not integrate such knowledge into the overall health system. There are many traditional remedies for which there are no western counterparts, and vice versa. The benefit of integrating traditional medicines into the imported (now standard) western medical system in place on most islands would be economics on the one hand while on the other it is likely to result in a healthier, more informed populace that is not as reliant on imported medicines as they are now (Carrell 2006, Cowell 2006).

Power generation

Although there is no traditional method of power generation, at least for the production of electricity and other major energy outputs, it is included here more as a reminder that there are a range of natural resources on islands that can be used to produce power. These systems include solar and wind power systems, biofuels, tidal power, ocean temperature differential and geothermal production, the combined solar energy and sterling engine, bacteria, and still others that remain in the initial experimentation stage (e.g., sea solar power at www.seasolarpower.com/ or bacteria as an energy source, see Tenenbaum (2006) at why-files.org/shorties/204bact_energy/)

Youth programs

While not strictly an element in revitalizing traditional knowledge, island youth represent the future of their cultures. It is this younger generation, particularly the 18 to 24 year old group, which will be assuming leadership and administrative positions. I look at my own crew on Kosrae, for instance (we range in age from late 30s to 50s) and ask myself, how long can we continue our work? At some point, the next generation will need to take over, but are they ready for that responsibility? Do they have the knowledge and skills? I don't know about the status of this generation on other islands, but on Kosrae this is the lost generation; they generally remain at home, but do not really gain full and responsible adulthood until their 30s, when they take a much more active role in family affairs. Many do not go school, there are no jobs for them, they are bored, they find themselves getting into trouble, and a few commit suicide (most often by hanging).

This program in revitalization or restoration of traditional skills can easily accommodate members of this population in community apprenticeships of sorts. Let them be the muscle in the gardening effort, allow them to take a key role in the markets, let them record oral histories, get them involved and engaged in the record of their culture and their past. They will eventually become the caretakers of cultural heritage, why not involve them directly now?

Concluding Remarks

The proposed model for self-sufficiency and the revitalization of traditional knowledge is mere prelude for island nations such as those in Micronesia to move toward a full and complete separation from imported goods and fossil fuels. There is still much more to be discussed in the how-to's and where-for's of this model, with many more details to be worked out and finalized; however, time, like the tide, waits for no one. The global fossil fuel crisis has prematurely accelerated the need for

this discussion, and has now placed the region in a position where efforts to preserve culture, heritage and identity are facing grave threats in light of other more pressing societal needs. Yet, this is also the time when it is even more important to insure that cultural traditions and identity are preserved. One way to insure the survival of cultural heritage is to revitalize it, apply it, and make it a part of the living community.

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