After The Fact

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Deal With It

The Secoya & Other Complex Communities in a World Turned Around

Secoya Survival Project Director Jim Oldham returned to Ecuador in October, accompanied by Dean Cycon, environmental lawyer and founder of Dean's Beans Organic Coffee. After their return ISIS Senior Fellow Mike Fortun interviewed them about their experiences with the Secoya. As in the previous issue of ATF, part of the interview is excerpted here. The intent is to give readers more than just a "project update," by delving into the specific issues, open questions, and unexpected obstacles that are always part of the complex situations ISIS projects are designed to address.

Mike Fortun: Why don't we start by discussing what the plan was going down to Ecuador this time, and then talk about what actually happened.

Dean Cycon discusses community dynamics and oil negotiations with the Secoya

Jim Oldham: First, I want to be sure to talk today about the similarities between the situation faced by the Secoya and those faced by other indigenous groups. That's something Dean has a lot of experience with. It often seems there's an apparent illogic

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Superposed Questions & Quantum Computers

By Howard Barnum

In a previous issue of ATF, Herb Bernstein and Mike Fortun discussed ISIS's work in "quantum teleportation." They dissected the strange quantum phenomenon in which two systems are "entangled," so that an observation made on one system reflects the results of any observation made on the other, in ways that are hard to explain with a local realistic model of physics. They discussed how this entanglement could be used – and now has been in Anton Zeilinger's laboratory in Innsbruck – to "teleport" the quantum state of one system, which is destroyed in the process, and recreate it at a distant location. Quantum teleportation is part of a broad new field of inquiry which I'll call quantum information processing. This article is about another area of quantum information processing — quantum computation. But it's also about how quantum theory has changed over the course of the century, what quantum computers might be able to do, and who might be able to actually make and run a quantum computer. And it's about limits, and how limits change.

Classical Computers

To approach the question of limits, let's start with the classical computer. Classical computers have limits on information storage and processing which are familiar to us from computer spec sheets—speed, RAM memory size, disk space, and so on. These limits are not set by the basic laws of microscopic physics (as in the quantum examples examined below), but by limits on our ability to control physical systems in a cost-efficient way.

The "0" and "1" of a classical bit of information – the "True" or "False" answers to one question, the smallest possible unit of data – are usually stored as different voltage levels in a semiconductor device. These are macroscopic states specifying, say, roughly how many electrons reside in a particular zone of the device: "some" or "oodles". These macroscopic states are compatible with

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Reconstructing Science for the Holidays

Looking for a gift for that hard-to-buy-for scientist on your list? Don't know what to get for the humanist who has everything? Looking for something for everyone? We'll make an immodest suggestion: *Muddling Through: Pursuing Science and Truths in the 21st Century*, the new book by Mike Fortun and Herbert J. Bernstein, just published by Counterpoint Press. What's it about? The short answer is, it's about reality – that's right, with two t's. For the long answer — including what reality is (and isn't), how scientist's (sort of) make reality, and why it's good (and bad) that reality is riddled with holes, contradictions, and questions – you'll have to buy the book. But perhaps a brief selection from the "Prologue" provides a better sketch of the book's content:

We need to think about and act on the sciences not in terms of infinity and transcendence, but of finitude and location; not in terms of awesome translations from the real to the ideal, but of complex conjunctions and collusions among things, words, and deeds; not in terms of a book of nature discovered and decoded by a small group of experts, but of an ongoing essay written and spoken by many, in a shifting, generative language. In short, we have to get better at engaging with the sciences as the kind of activities they have always been, the *only* kind of activities they can be: muddling through.

Muddling Through is a book about the sciences in the late twentieth century and about the kind of sciences we need for the twenty-first. It is a book about how the sciences make sense of the world and provide sense to the world. Think of it as the basic text for a different kind of science literacy project, a project to reimagine and re-enact the sciences as operations of language and thought, and as attempts, trials, limited experiments involving things, ideas, and just about everything in between.

The pursuit of both the sciences and of democracy is best imagined and enacted as "muddling through." Few things are more dangerous than unmuddled absolute faith in any answer or method, scientific or political. When it comes to the sciences, there are no simple answers like "just purify them," "just add values to them," "just keep them in their place," "just get rid of them," or even "just democratize them." They can't be pure, they already have values, they're everywhere, we can't get rid of them even if enough of us were stupid enough to want to, and democratizing them is an experiment, not an answer.

How do we use this book to turn muddling into muddling through? Section I introduces and elaborates on four navigational tactics that together define the method of muddling through. They are not only definitions, however; they are also responses to some hoary assumptions about the way science is thought about and conducted, namely, that facts are found, that theory and language mirror the world, and that science is a politically and culturally neutral tool.

First, *facts are not found, but made*. The scientific method does not discover truth, it produces it. Chapter 1 focuses on *experimenting*: it is at this middle level that the muddle between facts and theories in the sciences is most easily located. We avoid unquestioned theoretical abstractions, grounding our inquiries instead in the realm of human activities, where flesh-and-blood people negotiate with cranky equipment, murky concepts, and an evasive "nature." All of the stories in this chapter help us see how facts are made, without being made up, and how facts should always be subject to extensive inquiry.

Second, *theory and language refract the world, not reflect it.* Chapter 2 turns to articulating, focusing on the array of activities that produce what are conventionally referred to as scientific theories, as well as the broader narratives, world views, and interpretations that supplement their meanings. The notion of articulating steers us away from conceptions of

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theory as mirrorings of a world composed of atomistic facts, and toward an understanding of (many kinds of) theory whose status as "truth" depends less on faithful reflection of a preexistent world, than on the viability, strength, or robustness of a tangle of connections, or articulations… Pursuing sciences requires a better understanding of how, and where, language works, that the sciences involve a struggle to articulate something that has never been said before, an attempt to put new things into new words (and new words into new things).

Few things are more dangerous than unmuddled, absolute faith in any answer or method, scientific or political.

Third, *science is never neutral, but always charged, moving in a field of cultural and political forces*. The sciences are not tools to be wielded for good or evil by the powers that be, but inquiry infrastructures composed not only of instruments, theories, and language but of larger institutions and their material and cultural resources. Using Galileo and Darwin as central examples, we show in Chapter 3 how good science has always depended on a variety of power sources, and the sciences have always been an active, charged matrix remarkably sensitive to the pushes and pulls of seemingly distant ideas, institutions, people, culture, and, of course, capital. But the "charges" between the sciences and their historical and social contexts are contingent rather than determined; the affinities among the sciences, politics, and cultures are sometimes coarse and commanding, but just as often supple, subtle, delicate, and indirect. In any case, these contingent affinities are quite real; they shape and shade what we know, what we call truth, reason, nature, and justice.

If the purity or objectivity of the sciences was guaranteed by their freedom from the corrupting influences of power and their faithful mirroring of a real world, what upholds and legitimates a system built out of experimenting, articulating, and powering? If the sciences are geared less toward faithful, objective representations of a primordial reality, and more toward the production of novel effects and entities, new social possibilities and unheard-of ideas, does this mean that anything goes? Can we construct facts or theories according to personal or political whim? We take up such knotty issues in Chapter 4, and suggest that the demanding and difficult process of *judging* should be installed near the center of the complex webs spun through the sciences. We discuss notorious historical episodes such as the legitimation of eugenics in Germany and the United States, and Lysenkoism in the Soviet Union, and equally tangled current dilemmas posed by toxic torts and scientific fraud, to show how ever-present ambiguity and the volatile mix of the political and the scientific demand subtle, thoughtful, yet ultimately risky acts of judgment, every step of the way.

Every insight, as we've learned from both literary theory and the sciences themselves, depends on an accompanying blindness.

Section II can be thought of as accounts of *muddling in*: getting one's hands dirty, running new experiments, creating new institutional resources, organizing communities. Chapters 5 through 8 detail, respectively, efforts to clean up the military's toxic wastes at Westover Air Reserve Base in Massachusetts, an emergent illness that has been dubbed multiple chemical sensitivities (MCS), the articulations between health and "human nature" produced in the fields of molecular biology and biotechnology, and current work at the theoretical and experimental frontiers of quantum mechanics. These accounts illustrate the critical tensions involved in work within the sciences and the many ways in which culture and the sciences both collude and collide. They show that the potential for pluralized democratic engagement with technical problems does exist, as does the urgent need for new ways to think about, and take, responsibility within the sciences.

After muddling up and muddling in, we reiterate some of the processes, promises, and problems of muddling through in Section III, an essay on the guiding principles and methods for getting from here to there, without necessarily being certain where those places are, highlighting both the persistence and utility of difference and lack of closure. Combining democracy and the sciences, reimagining and re-enacting the sciences along the lines we describe here — such enterprises turn out to be riddled with paradoxes, contradictions, and questions. Every insight, as we've learned from both literary theory and the sciences themselves, depends on an accompanying blindness. We have to experiment with new habits of thought, new languages, new practices, and new institutional spaces…

Quantum Mechanics and Computers

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many possible microscopic states, and we don't care about the details of precisely how many electrons and how they are moving, as long as the numbers that are supposed to represent "True" are always sufficiently much higher than the numbers that are supposed to represent "False". As long as the device can tell the difference between "oodles" and "some," in other words, it can register these as the clean, definite states of the binary 1 or 0. So for computational purposes, the continuum of classical physics has been reduced to a gross, clumsy (actually, beautifully precise enough for its purposes) dichotomy.

Though it may be expensive, we can make these gross, macroscopic distinctions finer – to fit more of them on a silicon chip, say. "Semi-oodles" and "half some" will still translate into 1 and 0. But if we keep making such distinctions smaller, we will eventually run into the limits of quantum mechanics: beyond here, no more dividing up the continuum of energy into finer steps to represent additional information. It just can't be done.

Some History

Physicists encountered this kind of limit even before quantum mechanics became a proper, named, and famed theory in the 1920s and 1930s. In the late nineteenth and early twentieth century physicists realized the usefulness of the idea that in some physical systems, such as the electromagnetic field or the hydrogen atom, elementary physical quantities such as energy and angular momentum could not take on a continuum of values, as was supposed in classical physical theory. Such properties could only change in discrete, finite steps or "quanta". This idea gave the name to the quantum theory that eventually arose from it. Many measurements which classical mechanics would have predicted to have an infinite continuum of results have only a finite number of possible outcomes in quantum mechanics.

That may be a familiar story to many readers. But where quantum mechanics might seem to move from the continuous and infinite to the discrete and finite, in another way it allows a move from the finite to the infinite. While any particular question you might investigate (using an experimental apparatus, say) might have a finite number of possible answers for a particular physical system, there are in principle an infinite number of questions you can ask of a physical system. (Although at the same time, in quantum mechanics you cannot ask all the possible questions at once, and asking one may unavoidably alter the answers you will get to another question, asked later.) There is a continuum of such questions, in fact, though they don't all correspond to simple physical ones like "what is the energy of an electron in this atom?"

How to ask such questions with an experimental apparatus is a tricky business, but a paper by Michael Reck, Anton Zeilinger, Herb Bernstein and Philip Bertani provides a recipe for doing so, in the quantum system made up of light—one photon— bouncing between and through mirrors and prisms. And this continuum of questions does allow for an infinity of states, even though each question may have only a finite number of answers. If a quantum system is prepared so that it gives a definite answer to one question, there is a whole continuum of questions to which it does not give a definite answer, but for which it instead yields a probability for giving each of the different answers. From the point of view of the second question, for which the answer is indeterminate, the system is said to be in a "superposition" of the states with definite answers— some kind of spooky combination of all possible answers (mathematically represented by attaching complex numbers to each one). Classical physics has no analogue to this strange kind of "superposition" of what, for it, must be definite, mutually exclusive alternatives.

For example: you can measure (ask a question about) the "spins" of particles using a device that measures, say, the spin orientation along an up-down axis, or along an east-west axis. If you put a particle through the system and ask the first question, "Is it an up spin or a down spin?," you'll get a definite answer which will be either "up" or "down." But by asking this first question, you'll have made the answer to your (as yet unasked) second question – "Is it a west spin or an east spin?" – exist in that strange state of superposition: partly west and partly east at the same time. So as quantum mechanics imposes its limit of finiteness, it also raises the question: can we view quantum mechanics as expanding rather than limiting? Does the possibility of preparing states which are not limited to give one of a finite number of answers to the question at hand, but instead "superpose" these answers in a way that cannot occur in classical mechanics, allow us to process information in ways that a computer designed using classical ideas cannot?

Quantum Computers

Say we are trying to compute the values of a function, for all inputs in some set. With a classical computer, we would have to repeatedly run a program to evaluate the function, once on each input in the set. The simplest idea for doing this better with

quantum mechanics would be: make a superposition of all the inputs, and then run the computation "on all of them at once" by using this superposition as the input. This doesn't work, of course, since we can't read out all the answers at once; when we look at the answer, we will get the answer for a randomly chosen input (and we can find out which input that is, if we design the computer to keep the input around). But such a step—evaluating a function on all possible inputs—is a crucial piece, though not the whole story, of many of the quantum algorithms which have been worked out over the last ten or so years. These algorithms make use of the shadowy space of superpositions to do some computations faster than classical computers can.

The idea of computing speed is a subtle one; it involves problems which can have an input size that is arbitrarily large. For the problem of searching a database with a classical computer, for example, the input size is the size of the database. Speed is measured by the length of time it takes to do a calculation; this time increases with the length of the input to the calculation. The time is proportional to the number of "elementary steps" in the computation: things like swapping a piece of data from RAM into a register in the central processor, or adding two registers in the central processor. These "elementary steps" involve a limited number of pieces of the computer, each of limited size, at once. And the computation is finished when the computer outputs the answer in some standard form, such as characters on a screen.

A precise understanding of the idea of computing speed, therefore, requires that we specify a set of elementary operations and a standard format for output. For many very interesting problems, computer scientists think the time taken by a classical computer grows exponentially with the size of the input. This means that you don't have to pick a very large input to find a problem that a classical computer, even if it uses each elementary particle in the visible universe as a gate, are unlikely to solve even if it runs for as long as the universe has existed.

For database searches, a quantum speedup is possible, though not a terribly dramatic one. But for some of these problems, the time taken by quantum computers grows much more slowly— polynomially in input size. Such a quantum computer, while it might be much more expensive per basic operation, could be very useful if it can be made big enough to do classically intractable computations.

What kinds of computations are these? Well, return to the idea of evaluating a function with all inputs in superposition. We have seen that if we just ask the question "what is the value of the function?" we get one randomly chosen value. But we said that quantum mechanics allowed us to ask all kinds of strange questions that we couldn't ask, classically. It turns out that by asking some of these weird, "superposed" questions, we can find out, in one fell swoop, quite a bit about "global" properties of a function. These are properties that depend on all, or most, of its values, so that a classical computer would have to evaluate the function on every input in turn. An example of such a property is the period of a periodic function: a function that repeats a certain pattern several times as we run through the possible inputs in order. With quantum mechanics, we can find out the width of the pattern— a very useful piece of information indeed. Of course, it's not as simple as just asking one of the strange superposed questions. Asking a quantum-mechanical question may be a complicated process, and it takes time.

Omitting the technical details of that complicated process: it is the fact that we can "entangle" the state of the various pieces of a quantum computer that allows us to get the answers to weird, superposed questions to appear in the standard quantum output measurement fairly rapidly. "Entanglement" means there may be no definite state of each quantum bit independent of the others; but by manipulating a single quantum bit, we may affect the overall, entangled state of the entire computer, in a way which is classically impossible. (Quantum teleportation takes advantage of this phenomenon, too.)

I said that quickly finding out global information about a function, such as its period if it is periodic, was very useful. Useful to whom? Well, perhaps the technical discussion will become more vivid if we take a simple example of input size: the length of the RSA cryptographic key that you may use to encode your transactions over the internet, using, say, Netscape. The problem? Crack the code and read your secret instructions, automatic teller codes, passwords, or maybe access your brokerage account. Or, if you're a PGP-using cyberphreak, read what you thought were private conversations.

Since Peter Shor of AT&T showed that quantum computers could be used to speed up the problem of factoring large numbers (and related problems which form the basis for widely used cryptographic systems), there has been a huge increase in interest in quantum computing, information, and teleportation. A field which was the province of a few dedicated abstract theorists — some motivated by mathematical curiosity, others by curiosity about the strange properties of the quantum theory and its uneasy relationship to the concept of reality — has grown into a major source of new publications in mainstream academic physics journals.

The field was interdisciplinary

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Quantum

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from the start—physicists like Richard Feynman, David Deutsch and Richard Jozsa, computer scientists like Charles Bennett, Lov Grover, and Peter Shor, and mathematicians like Manny Knill have been among the pioneers and leaders. The Institute for Scientific Interchange (ISI, not to be confused with ISIS), accelerated the breakthrough phase of the field's development with its several-weeks-long workshops on quantum computation, held in Turin, Italy each summer starting in 1992. These workshops were funded in part by visionaries involved with the European high-tech company, Elsag-Bailey, who believed in the potential of quantum computation at a time when it still seemed slightly flaky and disreputable in the broader academic community. (With the National Science Foundation, ISI provides part of my postdoc funding in a joint Hampshire College/ISIS appointment.)

The possibility of new technology was an initial driving force in the field—but at a very abstract level indeed. In the field of particle physics, which has so influenced the popular picture of what theoretical physics is, the emphasis has been on discovering new physical laws. In a field like quantum information processing, the emphasis is more on seeing what can be done with the "known" ones. This has parallels with the growing interest in chaos theory, which reveals unexpected richness and new implications of already widely adopted, and relatively simple, physical laws.

Of course, it is not new for advances in physics to be driven by interest in designing new technology; much fascinating fundamental physics has come out of an interest in semiconductors and materials. And in any case, we can never be sure we are only exploring the consequences of known laws. Perhaps some of the quantum devices we are imagining will, when built, show that the limits of currently accepted laws go wrong, by not working as we predict. More likely, the ideas being developed may suggest new and fruitful ways of looking at the peculiar questions quantum mechanics raises about the nature of reality, if any, in scientific theories.

But there's something else that makes research in quantum computation and information theory uniquely interesting. Scientists here are motivated by more than their curiosity about new technological possibilities. They're also motivated by an almost philosophical curiosity about the foundations of quantum mechanics. The quantum theory has been surprising in its ability to help scientists and engineers predict experimental outcomes and design machinery, without providing a firm picture of the reality underlying the experiments and the technology.

At least some people think quantum theory provides no picture of reality. John Wheeler says about quantum mechanics: "No question? No answer!" Wheeler might say that the energy of the electron doesn't really exist until you build and run the device that asks the question "what is the energy of the electron in this atom?" Reality, as we experience it, is the result of our attempts to acquire information—information that, however, has no "source" in some external reality independent of our information-gathering interactions. Others counter that the reality pictured by quantum theory — best summarized in the (misnamed) "many-worlds" interpretation of quantum mechanics, where every possible experimental outcome occurs somewhere, and we are merely in a branch of the universe where the particular outcome we see occurred — is "really real," but this truth is simply unpalatable to most of us, and we therefore refuse to acknowledge it.

Pioneers in the field take up various positions on these philosophical issues. David Deutsch has used the idea of quantum computation in his writings to advance the "many-worlds" interpretation. Still others, following in the tradition of John Wheeler's "it from bit" ideas, hope that quantum information theory will illuminate the way in which we interact (or intra-act) with the world to "create reality" in a participatory or "transactional" way, rather than revealing preexisting reality. Most fascinatingly, it seems that it is the very interest in posing these fundamental questions, rather than the adoption of any particular position on them, that has predisposed some physicists toward the field of quantum information processing.

In its involvement with quantum information and computation through the Quantum Teleportation Project, ISIS is at the nexus of a rapidly developing new interdisciplinary field of science. We get to do cutting-edge science. We also get to see at close range how multiple influences — scientists' predilections and interests, interdisciplinary interaction, the reactions of the more established areas of the fields involved, the involvement of funding sources and agencies from the academic to the major corporate labs (IBM, ATT/Lucent, and lately British Telecom and Hewlett Packard have been involved) and military (Army Research Office, National Security Agency, and DARPA, to name a few major players) and nonmilitary (NSF, the European Union) — are playing out in the accelerating development of the field. It is a superb opportunity to study a scientific field in the process of development, in its internal complexities and interchanges with other fields of science and the larger social world.

Are we witnessing yet another case of abstracted, curious nerds being co-opted by big-money industrial and military interests into the development of yet more tools for advancing their power and agenda? Perhaps. It is currently very expensive to make quantum information technology work coherently — this has still not been done on anything approaching a practical scale! And it will undoubtedly be the province of highly capitalized institutions like governments, large corporations and major universities for, very conservatively, the next decade or two. The social value of at least one of its possible uses, code-cracking, is questionable, especially when the technology to do it is confined to already-powerful organizations. If you have adversaries working to develop quantum code-cracking, though, you'll probably want to understand how, and whether, it works. Another major application is quantum cryptography— again, confined to powerful organizations for the immediate future.

Quite possibly neither of these applications will ever prove worth the expense, even to large institutions. The experimental realizations of quantum computation now being investigated seem unlikely to scale up in their current versions, to computers of useful size; perhaps no more scalable alternative will be found.

But I think it far more likely that the swarms of experimental and theoretical physicists and engineers who are now thinking about the problem will come up with some weird and tricky way of coaxing easily replicable quantum logic gates from the myriad of available, or imaginable, physical systems. And then, the serious fun of thinking about "what if" we could manipulate quantum information as we now do classical information will be augmented by the even more serious fun of seeing how these "what ifs" become reality.

New Eyes for Old Project:

Haas & NTEN

By Peter Haas

Six months ago, I joined the ISIS team as the new staff for the Military Nuclear and Toxic Waste Project, also just known as "MilWaste" among folks at the office. Jeff Green, the coordinator for the project over the last three years, now has joined CPEO, another organization working to clean up the environmental catastrophe left behind by over 50 years of unregulated cold war military activity.

Working at this position has the singular honor of automatically becoming a member of the Restoration Advisory Board (RAB, the Pentagon-mandated citizen boards that are to help with the cleanup decision-making process) at Westover Air Reserve Base in nearby Chicopee. As an inquisitive Hampshire College student, I had long observed the circling of gigantic C5-A aircraft over the Pioneer Valley, flying at low levels and producing considerable emissions and noise. Little did I think four years ago that I would be actively engaged in the process of military cleanup upon graduation.

Being at ISIS has been a whirlwind of learning, writing and debating experiences. After over four years of RAB meetings at Westover, surprisingly little cleanup has been accomplished. There is also a troubling tendency of air force contractors and environmental engineers to downplay the concerns of community members. This is nothing new, at Westover or at other installations across the country: Important data is ignored and tests are often performed at sites that the military expects to come out clean. According to RAB community co-chair David Keith, "we citizens focus on cleaning up hazardous materials to protect health. The engineers [hired by the military] see their job as doing no more than is necessary to meet–without surpassing–the state's regulatory guidelines." He adds that military officials and their contractors are trapped in a narrow mindset – the idea that to avoid finding contamination is a "sound" way to come clean and contain costs.

We at ISIS have long been strategizing for the means to approach the problems associated with pollution at military installations, on a local and nationwide scale, changing science along the way. Recently, we led local college students to a brook bordering Westover to sample for contaminants, particularly deicing runoff which adversely affects oxygen levels in water and could pose a hazard to people swimming in the reservoir fed by this brook. This approach is part of our budding *National Technical Experts Network* (NTEN), in which we seek to bring scientists, expert citizens and college professors and their students into a collaborative network to exchange information, expertise and ideas to help each other in the daunting task of cleaning up the military installations around the country.

Like all other ISIS projects, MilWaste puts citizens, scientists, science teachers and their students at the service of cooperative, open, efficient community action. The people are the key to gathering the support and resources necessary for effective cleanup. It is important for both the citizens and the scientists/engineers involved to draw constructive connections between the technical community and grass-roots organizations.

Democratically deployed science can tap the knowledge, experience and expertise of community members

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Perspectives on the Energy Problem:

By Scott Tundermann

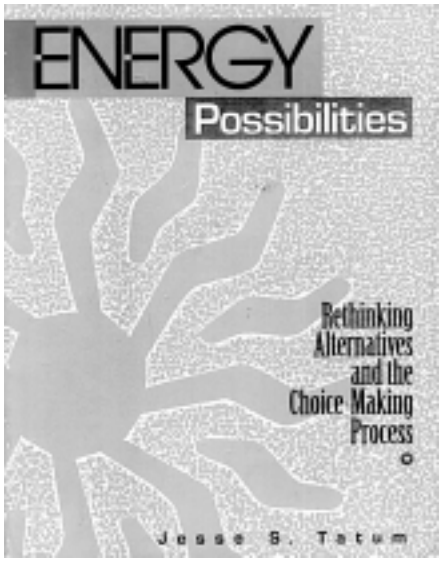
As ISIS's Sustainable Energy Project becomes established and plays around with conceptual building blocks, it's interesting to see what our contemporaries in the field are thinking and writing. Interesting, mind you, is an empty word; exciting, frustrating, affirming, and alarming all apply in various cases.

For this issue of *After the Fact*, I'd like to present two books of particular relevance to questions of interdisciplinary energy science. Dr. Jesse Tatum's *Energy Possibilities*, published in 1995 by SUNY Press, could in many ways be a mission text for our project at ISIS. It is an encouraging, substantiating book, letting us know that other thinkers are on the same page. David Nye's *Consuming Power*, hot off the 1998 MIT Presses, "is a social history of America as seen through the lens of energy consumption." It, too, is a refreshing, interdisciplinary take on the classic question of conventional energy dominance.

Before introducing others' perspectives, I should remind the gentle reader of the ISIS perspective on energy sustainability. It begins with the fundamental understanding that human energy consumption has extremely detrimental effects on the welfare of the planet and its occupants. (As an aside, it remains a dilemma to stand by the ISIS principle of constant re-questioning and critical analysis when the problems are so apparent and so constantly challenged by dissenters. Perhaps in this case we can rely on the opponents of sustainability to critique our assumption, and we'll go on with our work while lending a reasoning ear to their comments.)

Of the possible responses to the problem, technological fixes, policies, and economic machinations have all received eager attention and returned meager results. Conventional energy use continues to increase and the corresponding effects of global warming (extreme weather, polar ice deterioration, etc.), pollution (smog, acid rain, respiratory health problems, nuclear waste), and foreign dependence (military actions in the Middle East) are all exacerbated. In an attempt to approach the problem from a novel perspective (and because we think it's more effective), ISIS focuses on our cultural relationship to energy use: the fundamental attitudes and assumptions which underlie the way we cast our votes, make our purchases, and spend our time.

Tatum's analysis begins in a similar vein. "My purpose here is to offer the reader a new perspective on the energy problem, to argue that traditional analytical methods… may well be both inadequate and inappropriate." He makes his case by posing new questions, not by offering "The Solution." On one hand, this open-endedness is a shortfall in the work. His exhortation to keep experimenting, however, helps explain why he doesn't close the questioning. One of Tatum's core points is that the conventional energy picture has been constructed by a narrow range of "experts," and his solution is a wide rethinking of energy assumptions with open inclusiveness of experimental ideas and diverse cultures.



Of course, the second most important question is "why is it like this?" Nye's book, discussed below, is primarily devoted to its historical answer, but Tatum also outlines several sociological factors. The first he calls collective momentum—the assumptions society makes based on conventional ideas with no critical rethinking. The familiar and established has a strong advantage over things "radical," new, or unfamiliar. The norm is dominant partly because, as social change takes place faster and faster, people can't thoroughly engage with it personally and look to the responses of others, falling into a collective pseudo-consensus. As Nye's book shows, new technology has appeared at an increasing pace since the turn of the century. In parallel with the increasing specialization of people's skills, this trend makes it difficult for individuals to critically evaluate and respond to each innovation. Furthermore, technological progress has been marketed as the road to the utopian future, which also encourages uncritical cooperation. This evaluative paralysis, along with the entrenchment of conventional expertise (economic and technical), leaves us with a strong mainstream of collective momentum and a tiny range of viable alternatives.

Tatum's second factor is popular non-participation—the public's unwillingness and/or inability to challenge their experts. "We do not insist that policy makers and technical people seriously explore with us more than one set of sociotechnical alternatives." We don't make time to fantasize about alternative energy, and

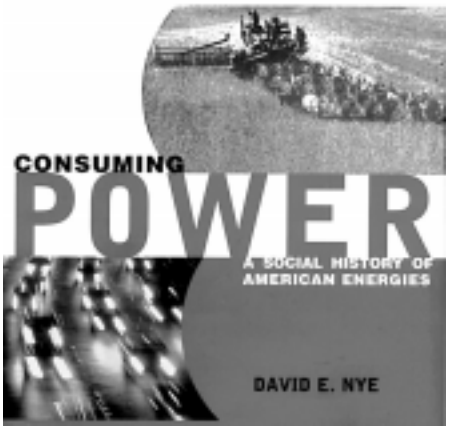
Thoughts on and from our Colleagues' Books

most of us would rather not have to. The much-documented "device paradigm," which promises technological solutions to all our woes, keeps us passive and receptive. No one, experts or public, takes responsibility for challenging the status quo. Hence, the status quo remains and the problems perpetuate.

Tatum's book is a breath of fresh air in a realm of mainstream economic and political theories, but he doesn't carry his analysis through to its conclusion. While the choice to not offer a solution is admirable, we must still ask: how will we encourage this experimental rethinking, this new way of living on the Earth and with each other? Presumably, *Energy Possibilities* is itself one initiative—those who read it and are persuaded by it will begin to implement its recommendations. They may also pass the book on to a friend. But the question of large-scale social reorganization remains. As it happens, it is the question on which ISIS is now particularly focused. What will bring about this new way of knowing the energy-lifestyle-environment interdependence? How can we facilitate it? That's at the heart of ISIS's project.

David Nye's book reads like an account of the Titanic—even though we know the whole story, we still cringe when we see the turning points that lead to the eventual disaster. As American society adopted each new technology, whether canals or coal furnaces, consumption increased inexorably. Until the last quarter of the 19th century, America used only a tiny fraction of the energy we take for granted today. "The average household of 1970 commanded more energy than a small town in the Colonial period. The largest automobiles had more horsepower than the entire Du Pont gunpowder works of the 1840s" (p.202). The low energy profile, mind you, was certainly not about sustainable choices: the predominant ethic since the Renaissance (and before) has been to dominate nature, to increase productivity and profit, and to expand to use all available resources.

Nye points out some fascinating



cultural constructions around energy. The billowing black smoke from Pittsburg's coal furnaces was seen as an exciting indication of progress and economic vitality. In some cases, positive associations with energy use were created by the corporations (automobile marketing, for example), while in others steam power, electricity, and subsequent energy forms really did correlate with greater leisure time, more and better crops, clothing, mobility, and so on. Growing energy consumption was an integral part of the amazing progress in quality of life into the 20th century.

But increasing energy consumption became habitual. Energy that originally meant significant improvements in day to day life was gradually extended into energy that offered status and an irrational sense of futuristic superiority. America's taste for huge automobiles (while MG, Citroen, and VW made the original subcompacts in Europe) and flashy new appliances ever supplanting their still-functional predecessors are symptomatic of this trend.

The last chapter of Nye's book, pleasingly, is called "Choices." He is very clear that there is no technological determinism—our energy profile has developed because of individual, social, and political decisions (cars rather than mass transit, subsidy of atomic energy, single-family homes in the suburbs). Our future will be a choice too. Nye reminds us that any change will be a transition rather than an upheaval—every energy system has developed gradually in the midst of the existing profile. And even if sustainable energy gains footing, our cultural assumptions will shape the direction it takes. The blossoming industry in electric and hybrid cars still embodies the entrenchment of the private automobile.

The concluding paragraph of Nye's book says "the choices made at the end of the twentieth century will determine whether the United States continues to consume more power per capita than any other country. In short, [Americans] must decide whether they think energy choices matter now, or whether they expect ingenious technologies to solve emerging problems later." His examples include commuting by car vs. mass transit or telecommuting, energy efficiency around the home, and cities built for cycling and local shopping vs. suburbs and shopping malls. In any case, it's clear that individuals bear the responsibility, though he admits that "they can even choose to believe in technological determinism, which will apparently absolve them from any responsibility to make choices."

In both books, choice is pointed to as the primary determinant. Unfortunately, neither offers to create change or facilitate a critical reconsideration. Fortunately, ISIS is on the job. Keep an eye on *After the Fact* for more on the project's initiatives throughout the coming year!

The Secoya in a World Turned Around

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to what goes on, and it's hard even for sympathetic people to understand how the Secoya get themselves into the situations that they get themselves into. But it's not completely unreasonable when you start understanding the structure of what's going on in these kinds of situations.

This trip had two main objectives: one was to continue our technical assistance work. In particular we were focusing on the aquaculture work, because we have a new consultant, Marco Silva, who's going to be working for at least the next six months on a very regular basis in some of the communities. We had visited him in July, after several different organizations had recommended him to us. So we wanted to introduce him to the different Secoya villages and give him a chance to work in each one.

The other piece of the trip was very focused on the negotiations with Occidental. In July and August, OISE [the Secoya organization] had taken the position that they needed three months to evaluate Occidental's proposals for oil exploration. The Secoya needed to evaluate the environmental impact statement, get technical advice and assistance to begin that work, and work with a department of the Foreign Ministry that was helping them lay out a long-term development plan.

So the Secoya clearly needed legal advice. Dean had met Elias and Isolina when they were here in 1995, so Dean had a background understanding of the project, and had extensive experience working with indigenous groups elsewhere. Elias actually reminded us that he had wanted Dean brought back in, now that negotiations with the oil company were such a high priority for them. So Dean volunteered to come down.

We also were beginning — through our coordinator in Quito, Lorena Gamboa — conversations with an Ecuadorian lawyer. And we were planning a conference in Quito with two other organizations in Ecuador – the Center for Economic and Social Rights (CESR), that came out of Harvard and had done the background study on the Texaco case, and the Casa de Cultura – to talk about the new legal situation in Ecuador, how that affects the Secoya negotiations, and the relations between indigenous groups and the oil companies in general.

Dean Cycon: The conference was cosponsored by Dean's Beans…

JO: Right. And there's one other foundation that promised support, but we won't name them since they haven't given the money yet.

MF: No money, no plug.

JO: So the plan was to travel with Dean, put on this conference that was bringing together different NGOs, and then go to Secoya territory and work there. But then we arrived, and discovered that there were a few missing pieces of information. A few events had taken place that we didn't know about.

In August, Occidental responded to OISE's three month moratorium on negotiations with a letter saying that was completely unreasonable, that the Secoya had taken a really long time on this already, and that it was in everyone's interest to learn right away if there was oil in Secoya territory. When OISE replied to that letter, by reiterating that they were taking the three months to go over Oxy's proposals, Occidental then contacted one of the villages, Centro Siecoya, and opened negotiations with them based on two legal documents.

One was the land title. Although the Secoya always think of their land as a single unit, legally there's a series of titles, rather than one title for the full block of land. And each title is in the name of a group of families who were living in that area at that time. So the title doesn't pertain either to OISE or to the Secoya nation in any sense, or even to the village of Siecoya, but to the families who happened to have been living in that area at the time the title was granted in the early 1980s.

The second legal piece is that each of the Secoya villages is legally incorporated. OISE as an organization has never finished that process of getting incorporated. So the villages have legal papers that give them certain rights — rights to negotiate contracts, for example. Whereas OISE does not have this status.

DC: The villages were legally incorporated by the Ecuadorian government. That dynamic in the 1970s and 1980s was very typical around the world, for governments who on the one hand, in a liberal sense, were trying to create a structure that they could deal with and recognize, and in a more nefarious sense, trying to mainstream traditional cultures, which is the seed of their undoing. That's a pattern that's been around for a long time, but in Latin America it was very big in the 1970s and 1980s.

MF: Well, that's part of the reason why liberalism is so effective, because it incorporates that nefarious element within its liberalism.

DC: Right, yet everybody thinks they get something from it.

JO: So this created an opportunity for Occidental. They signed an agreement with the people of Centro Siecoya to drill one well in Secoya territory. The people of Siecoya saw it as an opportunity for their smaller village, with less power in OISE, to

take the lead in negotiations that were going to affect them more than anyone else. It was also a chance for them to rectify some past inequitable distribution of benefits from previous negotiations. They were not going on their own. They were very clear about the fact that they intended to share what they received from Occidental. If anything, they were taking power, but they weren't just taking money. They were going to make some decisions about how that money was distributed, but they intended to distribute it among all of them.

This workers' camp for a topographic survey team shows the impacts oil development has on the rainforest.

MF: Had you had any previous signs that the people of Siecoya were, um…
DC: Feeling a little left out?
MF: Yeah. Or did this come as a total surprise?
JO: No, it didn't come as a total surprise. First of all, between July and October, we had heard rumors that this negotiation was taking place. But more than that, it's a historical situation that the leadership has come out of San Pablo – really, out of a couple of families. And there's not that many families altogether. So when you see the same three, four, or five people playing the dominant role for a number of years, these things do happen. And the particular resentment that was central is two years old, and is fairly well known. I guess the one thing that caught the people of San Pablo in the leadership of OISE by surprise, was how strongly this seemed to be felt. They saw it as a fairly minor issue, and it turned out to be fairly major.
MF: How did you learn about all of this? Through initial conversations?
JO: Yeah. When I arrived in Quito, Ramon Piaguaje — who's a painter who comes to Quito now and then to sell his paintings, and is quite successful – happened to be at the hotel where we were staying. I ran into him when we both were at the store. So that was the first news I had, the first night I arrived. Dean arrived the next day, and the conference was starting the day after that. And as soon as the OISE representatives arrived for the conference, they told us about it.
MF: But nobody from Siecoya came to the conference?
JO: Yeah, actually, one of the signatories to that contract with Occidental was to be one of the speakers at the conference: Celestino Piaguaje, who lives in Lago Agrio [a nearby oil town] but also lives in Siecoya.

In the meeting between Occidental and Siecoya, there were representatives from the leadership of OISE – the vice president, the treasurer, and a couple of other people from San Pablo. And they argued against the contract, in a fairly acrimonious debate, as I understand it. They were more or less shouted down, and the people in Siecoya voted to sign the contract. And then Occidental wanted very badly to have the OISE people sign. There are versions of the contract where there's a blank space, looking for the OISE signature. [Shows the document] Right there: Representate OISE. Blank.

In an earlier version, they had written "Leader, Secoya" or "Testigo de honor" – honorable witness – where Celestino signed. So he had no official standing, he was just another member of the community. But he was a weighty member of the community, who's well known publicly – he has a job in education in Lago Agrio, he's written books and articles. So he's a weighty member of the community. So they had the vice-president and the treasurer of OISE, who refused to sign the document. They said they couldn't do it without consulting with the people in the other villages. So the line was left blank, but Occidental still can use it to make a case.

After Siecoya signed the agreement, there were several meetings within OISE with the people from Siecoya. Eventually, the people from Siecoya agreed that they had made a mistake in signing the agreement.
MF: And Occidental said too late, the ink is on the paper?
JO: Yeah. The Siecoya came with this letter, saying that they realized that their unity as a Secoya people had been violated, and because of the pressures from Occidental they had broken with OISE in a way that wasn't correct. And they said they were annulling their signatures on the agreement of the 24th of September.
MF: So what changed Celestino's mind?

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Secoya

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JO: Celestino had an extremely complex and mixed thinking about the resolution. One of his concerns was the personal impact that he felt he was going to suffer from oil development. On the other hand, he had earlier been against the negotiation altogether, and had been one of the people most vocal about the cultural impacts that were going to result from oil exploration. So I think he was very divided within himself. And although I never heard anyone say this, I personally think that some of the people who were most against the agreement, but who were also heavily impacted because of where their land was – my suspicion is that there was something of a feeling that, now that the majority has voted to let the company in – which hadn't really happened, but there was a sense the majority was going to do that – then at least I'm going to get my share, and we're going to do this in a way that's fair to those of us who are most heavily impacted. So I think that's the kind of thing that was going on with him.

Celestino was eventually won over in a meeting where Elias played an important role. I think some of the OISE leadership felt that they might as well accept the contract, that fighting it was a lost cause. And Elias really rallied opinion in San Pablo, arguing that, this was not just one contract with the oil company, this was a threat to the Secoya as a nation.

And Gilberto [Piaguaje, President of Centro Siecoya) signed both the agreement with Occidental and this letter rejecting it, and by the time we got to Siecoya, the whole issues still had to be debate and analyzed. He was still not clearly on board with OISE.

MF: So you get off the plane, Dean,

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Other SSP News

At times it seems that our work related to oil development fills our time as much as it fills our newsletter, making it a challenge to remember all our other work. But the fact is, the Secoya Survival Project has been busy and growing in spite of the distraction caused by Occidental and the efforts needed to respond to them.

Our Indigenous Aquaculture Initiative has expanded to work with the Siona people as well as the Secoya and now involves 5 villages. We have hired a new consultant to lead this initiative. Marco Silva is an Ecuadorian hydrologist and aquaculturist who has advised a number of community aquaculture projects. He was hired after a group of Secoya and I visited him in Baeza, on the eastern slopes of the Andes, where he is working on community development initiatives based on aquaculture, ecotourism, and sustainable forestry. We were very impressed with his ecological approach to his work and pleased that he is available to spend two weeks per month in Secoya territory collaborating with Secoya aquaculturists in the development of indigenous fish culture.

Our drinking water initiative is also going forward. In the last few months we have focused on developing a satisfactory design for a cistern to hold rain water and training the Secoya in their installation. We now have a design that seems to meet our criteria of low cost, ease of transport and installation, durability and reparability. It combines a collapsible plastic tank and geotextile liner with an elevated wooden box to give the cistern shape, support, and head pressure. Prototypes are being installed in the Secoya villages of San Pablo, Siecoya, and Eno. Alfredo Piaguaje, of San Pablo, has been hired to oversee this work.

Initiative for Sustainable Development

One of our major goals for 1999 is a new project initiative for Sustainable Economic Development. The objective of this initiative is to promote sustainable local economic development based on, rather than destructive of, Secoya culture, knowledge, and traditions.

From the start of our collaboration, ISIS and OISE have shared the belief that long term survival of the Secoya culture depends on devising approaches to development that strengthen Secoya culture and au-

Marco Silva begins work with the Secoya by asking "why fish? Secoya answers include "food," "income," and "our children's future."

Miguel Piaguaje and his son feed fish while visiting a cooperative aquaculture business in Baeza.

tonomy. Our idea is to draw on traditional knowledge to develop local resources for survival in a modern economy. We will apply to sustainable development the participatory methods and mutual learning approach ISIS has used in work on clean drinking water, food production through aquaculture, and environmental protection.

We are currently in the planning stages for a putting together a multidisciplinary team to begin work in Secoya territory in January or February. We will be using participatory methods with the Secoya to assess needs and resources, much as we did to initiate the project in early 1997. This time the goal is to identify potential resources for generating sustainable income and providing an alternative to the destructive activities of oil development or monocrop agriculture.

Welcome to Sonia Lindop, Project Coordinator

In November we hired Sonia Lindop as Secoya Project Coordinator, ending a search begun late last summer. The hiring process was both exciting and challenging. We met lots of interesting and talented people as we worked to fill this multifaceted position. Now we are pleased that the search is over and to be able to welcome Sonia to ISIS.

Sonia is Peruvian citizen and US resident with a background in anthropology and television production. She has worked with indigenous people in the Mixteca region of Oaxaca, Mexico and studied the impacts of World Bank development policies in Haiti. She will be based here in Amherst but travel often to Ecuador to work with the Secoya. Sonia's initial responsibilities will include coordinating our drinking water initiative and taking the lead on our new economic development initiative described above but she and Project Director Jim Oldham will collaborate closely on all aspects of the project.

Funding the SSP

New initiatives, new staff, new responsibilities... It's all very exciting but it also is very challenging. Our budget has to grow and the question now is how to pay for it all.

Key to this project growth is the faith and support of our funders. This year New England Biolabs Foundation, the first foundation to support our work with the Secoya, gave us a new grant, this time for our Indigenous Aquaculture Initiative. We also received grant renewals from Public Welfare Foundation and the Food For All program of the Food Industry Crusade Against Hunger, the latter with a 50% increase from 1997. Private donations are also key, particularly to our work supporting Secoya negotiations with Occidental Petroleum (see interview starting on page 1).

Now an exciting challenge has been posed to ISIS by the Yankee Arrowhead Foundation. This local foundation has offered us up to $8000 dollars in support of the SSP if we can match this money two to one with new funding for the project. This is a great opportunity for the project because it provides an important tool for leveraging new support from other foundations. It also means that all private donations to the project at this time will be increased one dollar for each two dollars given. We want to use this opportunity to increase the project donor base so please let your friends know about our work and this challenge. Also please see our funding appeal on page 19 if you would like to help.

Marcelino Lusitande drinks from a new cistern, a product of the SSP's drinking water initiative.

The Secoya face two futures: local resources can be tapped for sustainable development, such as fish ponds, or they can be sacrificed for short term economic gain accompanied by oil company pipelines and separation ponds.

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and Jim starts telling you about all this. Were you surprised?

DC: I wasn't surprised that the oil company would do whatever it had to do to achieve its goals. That's the way it has to operate. It has its marching orders from the U.S. and from its shareholders. So that wasn't shocking. And the details, I didn't really understand fully for a couple of days, because I didn't really have the background. At the conference, it all started to unfold, as Celestino talked about his position and why he had signed in the first place. So it started to really sink in about the second day of the conference.

I saw the conference as having two goals: the first was to look at the legal documents that might have some relevance to further negotiations. The second and more important was to help formalize some sort of strategy for where the Secoya go from here, with the input of a lot of other people. There were representatives of the Shuar, another indigenous group; CONFENIAE, the Confederation of the Indigenous Nations of the Ecuadorian Amazon, also sent representatives; other international lawyers were there, and people from the government. So there was a range of people there offering their insights and observations on what was going on. I was focusing on the question: what's the dynamic that would carry this thing forward? And what kind of strategy would it be useful to evolve from here on? That's where I put my four cents in – there were two topics, and I put two cents in each.

The first was about the negotiations with Occidental per se, and the second was something that I started to see and felt strongly about: the need to restructure OISE to be more representative, and to be perceived as more representative by the communities that are involved in it. The first indication of this need was when Celestino was saying, "well, what do we do when we have this situation where an individual is injured more than the community? How does that individual get compensated" – and he's talking about himself – "when the road goes through my land? I receive an injury that's greater than the one received by somebody up in Centro Eno, or in San Pablo."

So I asked: isn't there a traditional means of resolving disputes like that? That would be the first place to look. But there didn't seem to be an immediate answer to that. So then I asked if there was anything in OISE in terms of dispute resolution, that would mirror their culturally-accepted patterns of how to resolve disputes. That didn't seem to exist either, because OISE really isn't at that level yet. So I suggested – in an offhand manner, but I was taking it very seriously – that perhaps OISE needed a code of conduct for its constituent communities, as well as one with Occidental. So that became the main focus for me for a lot of my work over the following days.

MF: Have other groups that you've worked with had those kinds of codes?

DC: Absolutely. The reason Elias wanted to bring me down in the first place – I've met him twice over the last six or seven years – was that he knew of the work I've done with a number of indigenous nations, about

restructuring their governing patterns. These are generally given to them, more or less, by missionaries or outside governments, and they don't fit the culture. So they can very suddenly shred the cultural and social dynamics of the group. I've worked with three indigenous nations to restructure those, pretty successfully.

MF: So these kinds of codes originally emerge in response to some outside force – government, corporation, whatever – that creates new kinds of conflicts that then need new kinds of social organizations to resolve.

DC: It's actually a two-stage process. First, if a given group takes on a new governing structure that disenfranchises a certain group – elders, for example. This is something that we've seen in Native American situations all the time. The constitutional format that the tribes adopt has no room for the elders, even though traditionally they've had a very important role to play. There's no formal role for them anymore, so they can be ignored by both the government of the tribe, and the governments that deal with them. And there are many other dynamics like that. So the first thing is that the governing structure that the people adopt starts to impact itself internally.

Then there's this added element of all these outside inputs that have never been there before. One analogy we were making when we were down there is, in the past, the forest provided the "management plan." You really didn't need to go beyond the forest; it provided everything you needed. But with the forest so impacted by outside forces, so that fishing and hunting are no longer guaranteed things, and with pollution and colonization and development – the forest no longer provides a complete plan. So what's the next evolution, to supplement that? And that's where they are right now.

JO: The idea that the government structure that they have is something that's imposed from outside is important. If you look at OISE, it's a structure that's not only new, but also very limited. There's a president, a vice-president, a treasurer, and a secretary, and whenever you have a subcommittee for some subsidiary issue, you create the same set of structures. Then there's a variety of coordinators: the authority is imposed there on a single individual, and there's no coordination between different activities. It's just taking a paper structure and imposing it on a group of people, rather than having something develop out of them. You can see that it's only twenty years old, and was borrowed from a mix of Ecuadorian legal structure and what the missionaries taught them.

What will be interesting for the Secoya, as opposed to a group that has a long tradition of an elders' council or something like that, is that in this group that's fairly independent and dispersed – where each family is making many of its own decisions – and except for some religious gatherings or healings or things like that, people didn't work together that much. There's not as much of a historical base of any kind of governing structure, because you just didn't need a whole lot of governing.

DC: So this need for some sort of restructuring that could bring harmony to the three communities, so they could present a united front to Occidental or any other outside entity trying to impact the community, was becoming very important to me personally. Then there were a lot of lawyer-like details to work out about documents, and getting people to formally agree on certain aspects of how they wanted to move in this matter. We ended up spending a lot of time late at night, with Jim translating and typing documents furiously, so certain people could sign this or that. So it was very, very busy.

But also it was important for me to get down to Centro Siecoya, and really try to understand what was going on. There were a lot of mixed messages coming out of the community, or the representatives of the community.

MF: What was your process for trying to understand what was going on?

DC: Talking and listening, talking and listening to as many people as wanted to talk. I think especially in indigenous communities, that's just the only way to understand the situation. Because the representatives don't necessarily speak for people. No more so than here, perhaps, but here there's more vested authority that you can rely on. But we would talk to people and they would say one thing, and seem to agree with what we were saying, and then vote the other way immediately thereafter. And then you'd talk to them again, and they'd change their mind again.

JO: We spent a day and a half in San Pablo, talking to a lot of people there, including the leadership of OISE. There was a meeting there in San Pablo where the outstanding issue was some zinc roofing that hadn't made it to Siecoya. People were saying, "it's not a big deal, we can give them whatever they want, we can resolve it, we shouldn't let this get in the way." And it seemed like things were fairly easy to resolve, because there was a lot of understanding there about the problems with Siecoya, as much as we understood that.

DC: And there was going to be a meeting the very next day, where many people from Centro Siecoya would come up to San Pablo for a big meeting about this very issue.

JO: So then we had a very informative evening in Siecoya, at home with Gilberto, whom we had traveled with down river. But while we were talking with him and Miriam, his wife,

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and learning a lot more about the complexities of the problems, we got a sense of how the hurt was deeper than anyone in San Pablo made it out to be. And the *motorista*, the guy who runs the canoe, went out to inform everyone about the meeting in San Pablo the next day, and came back and told us that absolutely no one was planning to go to the meeting tomorrow. Gilberto had been ready to go, even though he was feeling bad about it, but he was president of his community and he was ready to go up. And it was a very democratic decision – unanimous: we are not going to the meeting.

DC: And that they weren't interested in annulling the contract.

MF: After they had signed this letter saying they did want to annul the contract?

DC: See, it's not *they*. It's only two people that signed this letter. That's the problem.

JO: That's a very important point. Two days later it finally did become *they* after we got folks in Siecoya together for a meeting (our aquaculture work draws crowds) and spent some time with them reading the contract. When they understood the contract they had been told was "only for 12 months" (which is legally true) had a clause talking about transferring title of their land to Petroecuador [the state oil company] they felt they had been lied to by Occidental. Still, they key to resolving the problem with the rest of OISE had as much to do with resolving the sense that OISE leaders had also betrayed them by failing to represent their interests. Much of our work that day involved working with Siecoya to develop a proposal for addressing the internal problems of OISE as a prerequisite for uniting to challenge the contract with OXY.

The Other Side of the Occidental Coin

MF: I want to come back to this problem of fractured community, but first tell me what's going on with Occidental up here?

DC: One of the charges I was given by the OISE leadership was to contact Occidental in the United States, and to bring to their attention the situation in Ecuador and the behavior of their subsidiary. So I did. I've spoken with people in charge of international oil production for Occidental, with the agenda of getting them to annul the agreement with Centro Siecoya and ease up on the pressure to get an agreement, at least until the Secoya can restructure into a more unified negotiating body.

JO: And spend some time evaluating what whatever they're negotiating for will mean.

DC: And to consider much more carefully the environmental impacts that would come out of any possible exploration, and cultural impacts. These have really been ignored. The environmental impact statement that was prepared on behalf of Occidental by its consultants didn't get to the Secoya until very late into the negotiations. Frankly, I don't think people took a really hard look at it, because nobody does: these are voluminous, scientifically written documents that are very difficult to read. But Lorena and Paulina [of CESR, one of the conference co-sponsors] plowed through it at their end, and we plowed through it at our end, and we presented it to the communities in a coherent fashion both at the Quito conference and in Centro Siecoya. And people were ultimately pretty astounded by the impacts, which were clearly identified, even though they were minimized. But very clear. So I think that was one of the major contributions we made going there this time, to bring that environmental impact information to people so they could make their own decision on it.

But one of the things we were talking about doing is, if the negotiations continue, is to evolve a negotiating strategy that could really protect the environment, and really includes decision-making from the Secoya. Because to date, not a single one of the contracts that's been going back and forth is a real, rock solid contract that's fair to the Secoya, monetarily or environmentally.

JO: The contracts consistently ignore the environmental issues completely. They don't even mention the environmental impact statement, let alone anything beyond that.

MF: But why on earth should Occidental agree to include the Secoya in that process?

DC: The world has changed substantially since even twenty years ago, when companies like Texaco could go down to the Amazon and do whatever they wanted, totally unregulated. There are eyes and ears everywhere now, thanks to the Internet, email, a heightened interest in education on the part of these countries' environmental groups and indigenous populations. And so you just can't get away with what you used to be able to get away with. Recognizing that, a lot of organizations like Occidental are trying to be better "partners," to the extent that they feel they can. And they bring on anthropologists and environmentalists, and they make a stab at addressing these issues. But the bottom line is always the bottom line.

Well, when you look at the bottom line, and some elements of it are lawsuits, civil insurrection, destroyed wells, an uncooperative population,

and lower oil prices, you have additional leverage in the negotiation. So it's no longer: this is what we want, this is what we're going to get, and here are some trinkets. In getting them to acknowledge that OISE and its advisors have a role to play, and that they can't go forward without including them, I don't think it's going to be possible to slip any of these three- or four-page oil agreements past people anymore. So that door has been closed. Occidental now knows that, and from our conversations with them, they're very aware that the next step, if they're not more responsive, is possibly a campaign or lawsuits here against Occidental. And they don't need it, and their shareholders don't want it.

Dean sharpens a machete during a quiet moment in the Secoya village

JO: They've just spent the last year with a very visible campaign on the U'wa case, in Colombia – full page ads in *The New York Times*, big demonstrations outside their shareholders' meetings. So they're very sensitive right now to this.

DC: And we spoke about that in our conversations with them. We made it very clear that this could become another U'wa case, and they don't need it. My approach to Occidental, by the way, was not confrontational. I've been a corporate lawyer, and I understand the structure of that culture as well as the structure of indigenous cultures. I don't agree with them at all, but by trying to respect what their needs are, I think I gained an audience with them that I wouldn't have received otherwise.

Contrast and Compare

DC: I was struck by how the inner dynamics of the Secoya community were very, very different – but in many ways similar – to indigenous societies I've dealt with in other countries. I spent a year working with the Maori in New Zealand. I've got a total of twenty years working with groups such as the Lakota, the Assiniboin, the Gros Ventre, and several groups in Canada. One thing that stood out to me was that the Secoya seemed to operate in smaller family pods, or extended family pods, and that holds a good degree of their attention and loyalty, as opposed to the Secoya nation as a whole. Although it's not exclusive, the dynamic that creates for trying to work as a nation is very different from what I've seen in, for example, the Maori or the Plains Indian cultures.

MF: Because the federation isn't as central or powerful, and it becomes more a…

DC: More fractured. There seems to be a traditional lack of a communal or consensual decision-making process with the Secoya. I'm not an anthropologist, so it's just an observation, but there doesn't seem to have been a reason for that kind of coordinated approach to things in the past. That's very different from the experiences that I've had with other people. There's a lot of inter-tribal fractioning among North American indigenous people, or Maori tribes – there are 44 Maori tribes in New Zealand, and a lot of them don't talk to each other. But I've never experienced such independence within an identified cultural or tribal unit. And I think it's a strength and a weakness. The Secoya people are incredibly strong, but they're not organized to take advantage of their strength. So that's going to be very interesting, as I'm hoping to continue working with them on a project – funded by Dean's Beans! — about creating something that takes advantage of their strengths, and tries to navigate the weakness of having no strong communal tendency. I don't know what that's going to look like, but we'll see.

Another part of this relates to the Secoya's style of life. They've lived in the forest, on the rivers, in small communities. And the forest is their "management plan," and provides the basic resources for each family to provide for itself. And each small group or town can pretty much provide for itself, without the need for – for example, with the Plains Indians – the need for coordinated hunts. Or with the Maori, coordinated fishing. So until recently, the ecological tie has held true, and I think that that's shredding, and now something new is to be evolved. And that's where part of the problem lies.

MF: What other differences or similarities do you see between the Secoya and other indigenous groups you've worked with?

DC: Well, the first thing, which is a pretty common dynamic between in-

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The Secoya in a World Turned Around

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digenous cultures and Western governmental cultures, is that indigenous people as a general rule don't seem to appreciate the formal power that's invested in legal systems by Western-style governments. So for example, the people in Centro Siecoya would sign one thing and, at the moment, mean it. And yet feel completely free to expect that that document which they signed would be annulled by the simple changing of their minds, without really appreciating that a signature on a legal document that has the power of the state and the authority of major multinational corporations and para-statal corporations behind it, is a thing of immense power – in that system. And I see that a lot.

MF: And — I know this is a hard question and it's not a clean division – is that simply from lack of experience, or is there some kind of cultural difference?

DC: I think it's both. It's hard to say, in this day and age, that anything's clean, because there's such a mix of cultures, and issues of education and exposure. Frankly, nothing I would say would be very different from experiences that I've had in some towns in Massachusetts trying to fight hazardous waste programs or nuclear waste facilities, or anything else. It's not that different. People tend to be fairly short-term oriented, asking "what's in it for my community immediately that's tangible?," versus those "things" out there like environmental destruction that are farther in the future. So there's something in that that's common to people in general, I think.

MF: And also the notion of "community" everywhere starts to show its warts and fractures and pollutions once you push on it hard enough.

DC: But at the same time, I think there is a cultural difference. This whole institution of Western government is only a couple of hundred years old. It wasn't long ago we were feudal, which is a very different system. Or mercantile, which is a very different system. There's sharia, the Islamic legal system, which is very different from ours. There's the common law system which is different from the civil law system. They're all very different. So we have this perception that the way we think and the way we legalize is a given in the world, and it's not. It's a blip.

I'll give you another example that's parallel to what went on in Centro Siecoya. It was the first time I ever worked for a tribal government, as opposed to traditional groups on reservations. I was brought to Fort Belknap, Montana, at the behest of the tribal government, to help the tribe really understand the impact of having the largest cyanide-leaching gold mine in the world on their border. So I took all the available information from EPA, the environmental impact statement that had been prepared by the company, and their general information, and I went out and I spent four hours going through all the environmental and cultural impacts that are usually associated with mining like this. And people were nodding their heads, and completely supportive of what I was saying. And even though the tribe couldn't stop the mine, because it was theoretically on federal land, not Indian land, they had some voice in it. So they were preparing a resolution to say whether they approved or opposed it. And after four hours of nodding heads, they voted to accept the mine and not to reimburse me for my airfare! I was so mortified that turnabout had taken place. That was in 1984. That was the first time I was confronted with a 180 degree shift, in such a short period of time. And the tribal leaders had brought me out specifically to back them up in denouncing the mining operation. So these kinds of situations are not unusual.

JO: I think these kinds of experiences really helped you to respond immediately to what was going on with the Secoya. Because a lot of people get frustrated, thinking that the Secoya say one thing one day and another thing another day. But often it's not the Secoya saying one thing one day and another thing another day, it's *a* Secoya said one thing and *another* Secoya said another thing. So for example, I sent out a fundraising letter by email just before we went down, and I got a very strong, critical response from a woman who has worked down in Ecuador and knows something about the situation. She asked how I could write that the Secoya were "trying to decide" what to do about the oil company? Not just the leaders, but the majority had voted in favor of letting the oil company come in, she said.

Yeah: and they voted *against* letting the oil company come in. They've done both several times. The problem is a bit like the proposal that Quebec secede from Canada, but at least in Canada they have a Supreme Court that says, you can't just vote to separate the country and be done with it; you still have to go through the courts and decide whether it can hold up. But in the case of the Secoya, they can vote six times against the oil company, and the one time they vote in favor [snaps his fingers], the company's in. There's no second chance on that.

So this capacity to recognize that

a community is just that: a community with a lot of different individuals, a lot of different opinions, and a wide range of needs – with different ones uppermost at a given time. That's what you need to be able to work out there. You need to be able to listen to people in San Pablo, and then go down river and hear the exact opposite and suddenly have your world turned around. And deal with it.

Haas & NTEN

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— people who worked and played at the base, who have known all the practices and problems of handling substances on the Base. They embody the Base's institutional memory, and they are the context experts. They include everyone from the editors and reporters of the town newspapers to the local librarians, the self-educated activists and environmental scientists, the military veterans and retirees, and the former vendors and suppliers, to the (now grown up) kids who played on the back lots. And they potentially include local science teachers, scientist/engineer-neighbors and community environmental scientists.

Our grassroots national collaborators in the military cleanup effort have given us the go-ahead to develop NTEN. Soon we will be generating an electronic mailing list and developing funding plans with the people who attended our brainstorming meeting in San Francisco in September. It promises to be an exciting endeavor.

ISIS thanks those who have given generously since June 1998 (donors of $100 or more are in bold):

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