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Educating A Nation: The Natural Step

**A remarkable nation-wide program unites Sweden
in moving from linear to cyclic processes -
the hallmark of sustainability**

by Karl-Henrik Robèrt

One of the articles in [Making It Happen \(IC#28\)](#)

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Imagine the following: The scientists of an entire nation come to consensus on the roots of our environmental problems and the most critical avenues for action. The nation's head of state then gives his endorsement to their consensus report. An educational packet based on that report is prepared and sent to every household and school, so that citizens and students can learn the basics of sustainability. Then a roster of famous artists and celebrities goes on television to promote and celebrate the birth of this remarkable national project - a project that, in the long run, promises to completely reorganize the nation's way of life to bring it into alignment with the laws of nature.

While this scenario may read like a fairy tale, it is already an historical fact. The name of this project is The Natural Step, the country is Sweden - and the catalyst behind this remarkable effort is Karl-Henrik Robèrt.

Karl-Henrik Robèrt, M.D., Ph.D., is one of Sweden's leading cancer researchers (as well as a former national karate champion). It was his desire to get beneath the details of the debate on the state of the environment - and to take action based on agreed-upon facts - that started a snowball that has grown to such impressively hopeful proportions.

This article is adapted from a piece he wrote to help get The Natural Step started in The Netherlands. It is followed by excerpts from a lengthy interview with Karl-Henrik conducted jointly by IC founding editor Robert Gilman and Nikolaus Wyss, a Swiss journalist. This story is one of the most inspiring we've ever heard, and it raises the question: How long before every nation on Earth takes The Natural Step?

Up to now, much of the debate over the environment has had the character of monkey chatter amongst the withering leaves of a dying tree - the leaves representing specific, isolated problems. We are confronted with a series of seemingly unrelated questions: Is the greenhouse effect really a threat, or will it actually prevent another ice age? Do catalytic converters on cars filter out toxic emissions, or do they cause even more damage to the ozone layer than freon? Are forests dying from pollution, or from natural phenomena? Is economic growth harmful, or does it provide resources for healing the environment? Will the costs of phasing out non-renewable energy sources outweigh the benefits? Should we clean up our own backyards, or concentrate our efforts on countries that are even more polluted? Can isolated countries accomplish anything useful on their own, or must they wait for international agreements?

In the midst of all this chatter about the leaves, very few of us have been paying attention to the environment's trunk and branches. They are deteriorating as a result of processes about which there is little or no controversy; and the thousands of individual problems that are the subject of so much debate are, in fact, manifestations of systemic errors that are undermining the foundations of human society. There has been a basic scientific agreement about the causes of that deterioration for nearly half a century, and it should be possible to anchor key decisions affecting society in that scientific consensus. We must learn to deal with environmental problems at the systemic level; if we heal the trunk and the branches, the benefits for the leaves will follow naturally.

FOCUSING ON THE CELL

Let us begin by focusing on the cell. We cannot discuss politics or ideologies without it: The cell is only concerned with the conditions necessary for sustaining and propagating life. It also reminds us that we are inescapably a part of nature: There is much less difference between the cell of a human and that of a plant than is commonly understood. And if we compare our cells with those of other animals, we must go to the molecular level in order to perceive the differences that do exist. The basic structures and functions of our bodies are nearly identical to those of eagles and seals, all the way down to the molecular level. It is very clear that, from a biological standpoint, we are not the masters of nature, nor even its caretakers. We are part of nature.

It also happens that nearly all of our natural resources have been created by cells. Over billions of years, a toxic stew of inorganic compounds has been

transformed by cells into mineral deposits, forests, fish, soil, breathable air and water - the very foundation of our economy and of our healthy existence. With sunlight as the sole energy supply, those natural resources have been created in growing, self-sustaining *cycles* - the "waste" from one species providing nutrition for another. The only processes that we can rely on indefinitely are cyclical; all linear processes must eventually come to an end.

CYCLICAL VS. LINEAR PROCESSES

For roughly the past hundred years, humans have been disrupting the cyclical processes of nature at an accelerating pace. All human societies are, in varying degrees, now processing natural resources in a *linear* direction. Our resources are being rapidly transformed into useless garbage, some of which is obvious to the naked eye, but most of which escapes awareness. The smaller portion can be seen in garbage dumps and other visible waste. By far the larger portion can be thought of as "molecular garbage" - consisting of the vast quantities of tiny particles that are daily spewed out into the earth's air, water and soil.

With few exceptions, none of this garbage finds its way back into the cycles of society or nature; it is not taken up for repeated use by industry, nor is it put back into the soil. As a result of poor or non-existent planning, the volume of garbage is too large for nature to reassimilate, and some of it - toxic metals and stable unnatural compounds - cannot be processed by the cells at all.

The ultimate consequences of all this are impossible to foretell. The complexity of ecosystems is so great that we do not know the tolerance levels for any of the thousands of kinds of molecular garbage; it is even more difficult to anticipate how they will interact with each other. In addition, it often takes a long time for the consequences to appear: The effects of today's pollution will not become evident until tomorrow. It is from that perspective we must respond to questions like, "Is the greenhouse effect really a threat, or will it actually prevent another ice age?"

REVERSE EVOLUTION

We have lost control, and are moving backwards in evolution. The extinction of species, deforestation, the greenhouse effect, acid rain, and all the other assaults on nature are but different aspects of the same mistake - increased reliance on linear processes. As we busy ourselves with tearing down more than we rebuild, we are racing toward world-wide poverty in a monstrous, poisonous garbage dump. No temporary trade balances, illusory bank accounts, or pseudo-scientific disputes can save us from the consequences: The only thing that can is the restoration of cyclical processes.

To argue about the cost of that restoration borders on the absurd. The question is not how much it will cost, but rather how much it will cost to

hide in ignorance and wait for the problem to become even bigger. It may have been possible to postpone payment for a few decades, but now the bills are starting to pile up: It is already more expensive to harvest declining fish stocks over wider and wider areas; it is already more expensive to make water fit to drink; and we haven't even started to pay for the cleanup of toxic metals, radioactive and otherwise, that we are constantly injecting into our world.

A STEP TOWARD CONSENSUS

The Natural Step is a network of experts from various fields who are attempting to find out how much can be accomplished by using scientific consensus as the basis for decision-making in human society. The network includes scientists, economists, teachers, environmental activists, politicians, business leaders, artists, and others who are all contributing to a mutual effort for a future based on respect for natural laws.

Central to that effort are consensus reports of The Natural Step on the current condition of the environment's "trunk and branches", and on the strategies needed to reverse their deterioration. The reports are distributed through a variety of media: illustrated booklets and audio cassettes to all of Sweden's schools and households; seminars for members of Parliament; study circles; television programs; establishment of an "Environmental Youth Parliament"; a journal targeted at readers in the business world, etc.

The ultimate purpose is to find the common ground where all sorts of people - right- and left-wingers, employers and employees, atheists and believers, etc. - can meet. When they can all agree on a set of scientific facts, and on the logical implications of those facts, the way is cleared for concrete action.

THE NECESSITY OF AN OVERVIEW

If a politician were to ask a random selection of scientists whether or not the reproductive organs of seals are destroyed by the chemical PCB, it is very unlikely that he would get the kinds of answers that would be helpful in arriving at a decision. He might hear, for instance: "That has not been definitively established yet." "Yes, *that* has now been clearly established." "Our laboratory has identified a toxin that plays a far more destructive role," and so on.

That's the sort of thing that happens with questions about the leaves of the environmental tree. But, if one begins with the trunk or branches, the answers become clearer and more consistent. For example:

Is PCB a naturally occurring substance? No, it is artificially manufactured by man. All scientists agree on that.

Is it chemically stable, or does it quickly degrade into harmless substances? It is stable and persistent. On that they all agree, as well.

Does it accumulate in organisms? Yes it does.

Is it possible to predict the tolerance limits of such a stable, unnatural substance? No, since the complexity of ecosystems is essentially limitless. Nevertheless, it is known that all such substances have limits, often very low, which cannot be exceeded.

Can we continue to introduce such substances into the ecosystem? Not if we want to survive.

The final answer is what the politician actually wanted to know from the beginning, since he is probably not particularly interested in the reproductive organs of seals. Yet, most public environmental debate is preoccupied with such relatively minor details. This happens whenever we fail to proceed from a basic frame of reference, or overview, which makes it possible to focus on the fundamental issues without getting lost in a confusion of isolated details.

MODEL COUNTRIES AND THE WORLD

To greater or lesser degrees, all countries have introduced the same kinds of *systemic* errors into their societies, and population growth means that more and more people are expanding on the same mistakes. Natural resources are wasted in linear processes, and molecular garbage is exported across international boundaries. However, there is not much point in waiting for international agreements to restore cyclical processes. The first steps must be taken by dedicated individuals, businesses, and governments who are ready and willing to take the initiative.

What the earth needs most is a variety of useful models - model homes, buildings, companies, communities, and countries, all demonstrating how to make the transition from linear to cyclical processes. Positive examples are an extremely powerful force for change, and it takes only a small proportion of a population - perhaps as little as 15% - to stimulate dramatic improvements. With the right leadership, Berlin Walls can fall, and bleached paper products can be replaced by less harmful alternatives.

Fortunately, it appears that there is now a growing core of thoughtful decision-makers who understand that the time to act is now. Whether we want to help others or ourselves, to conduct our affairs ethically or compete in tomorrow's markets, the possibility of success rides on the shoulders of well-informed business and political leaders who are supported in their efforts to base the foundations of society on natural laws. A strategy for achieving that goal can be derived from a multi-disciplinary scientific consensus. Above all, it is necessary to cure our addiction to the false, short-sighted economies of linear processes, and to restore the health of nature and society by investing every available resource in cyclical processes.

Despite all the quibbling over peripheral issues, there is already enough of a scientific consensus to get on with the necessary work. In most cases, it is

simply not true that "more research is needed": In order to predict that you will die if you jump off the top of the Eiffel Tower, it is not necessary to calculate that it is 345.23 meters high at 20o centigrade. Since environmentally-sound technology is already available, the pace of transition to cyclical processes is limited only by our spirit of sacrifice and our will to act. The longer we delay, the more painful the sacrifices we will have to make.

Since few countries have the capacity to provide positive examples, the responsibility of those who do is particularly great. It is also in their long-term self interest to conserve natural resources, reduce pollution control costs, and develop the technology that the entire world will demand, sooner or later. Of course, some technologies and industries lend themselves to the necessary transformation better than others; we can begin with them, and let the others benefit from their example.

Among nations, which will take the leading role - Sweden? The Netherlands? The Natural Step has now been taken in both countries, and we in Sweden are even so fortunate as to have received the King's blessing and support. I wish The Natural Step of The Netherlands all the best for the future, and I hope that they - as well as others - will be even more successful than we have been. In that competition, we have nothing to lose and everything to gain.

"That Was When I Became A Slave"

*Excerpts from an interview with Karl-Henrik Robèrt
by Robert Gilman and Nikolaus Wyss*

I am a scientist, and I'm also an active physician and the head of a cancer unit. When you treat patients with cancer using modern methods, it means that during your career - even if you are reasonably young, as I am at 43 years of age - you have experienced how a lot of patients who can be cured now would have been dead within months at the time when I started my career! It's a tremendous change, generally implemented by very hard work in big teams.

But at the same time, pollution is increasing outside the wards of the hospital at a rate which is incredible. Most scientific groups who have analyzed these problems agree that we have one or two decades [to turn things around]. But we are arguing over the details. We are running around looking for knowledge, but we are drowning in information. This is the problem.

ON CONSENSUS-BUILDING

To me it's just obvious that there must be some truth about our environmental problems that is true for *everyone*, whether they're left- or right-wingers. There must be some truth that we could define together based

on knowledge, and I wanted to know where this knowledge was. How much could we agree upon from the facts?

But all I saw was this *arguing* going on - it was like watching a house burn down while the fire brigade was arguing about how the fire brigade should be organized. I felt, "God! Couldn't we agree upon *something*, and see how much we could start *doing* on that basis?"

That was when I became a slave to what became The Natural Step. I started to write the consensus report - which was only a consensus in my own brain, but I tried to foresee the problems that people had when they wanted to reach consensus. For example, if I wanted to get rid of nuclear power, I tried to understand how intelligent people who *want* nuclear power would argue. I did my best, then I sent this report to the best scientists in Sweden - communists as well as conservatives. I asked them, "Could you please find the errors in this for me?"

If there is anything that unites professors, it's that they can't help finding errors in what others have done, so they helped me very well. I got the document back, solved the problems they had pointed out to me, and sent out a second version.

I did this 21 times.

The final report is the 22nd version of the first concensus report. This was very challenging to industry and to a lot of organizations, because at last somebody had gathered a *consensus* about what we should do. I managed to raise money to distribute this report to every Swedish household and every school - 4.3 million copies. The package comes with an endorsement from the King, and it employs a very simple pedagogical method: an audio cassette talks along with the pictures and explains what is wrong - the systemic errors that make up the trunk and the branches of the pollution tree - and finishes by explaining what we must do if we want both to survive and to keep our wealth, which really amounts to the same thing.

Wealth is based on structure, and we are tearing down structure. I explain this in a way that makes it very easy to understand, and I explain the tests that have been done. And now, together with the Green movement and the adult education network, we have started study circles all over Sweden with this report as a basis.

ON BUILDING THE NETWORK

When I travel to Hungary, Poland and Switzerland, I tell them the same thing: you must identify the slave who doesn't want to have power in any respect except to be the glue between powerful and intelligent people. If you can identify him and make him work, there is tremendous power in this idea, because almost everyone who can think would like consensus to appear when it's about survival and natural resources.

This is not a new organization. This is a *network of people*. We have a lot of good people involved from Greenpeace, the Swedish Federation for the Preservation of Nature, the World Wildlife Fund, and so forth, but we are not getting any money from membership as those organizations do. Just the opposite - we are begging for money from industry, and finding other sources, and our message is, "Please *join* Greenpeace or the World Wildlife Fund." And that has had a very big effect on their membership.

So I built networks wherever I went. I phoned one of our best-loved artists, Lillian Fosch, and said that I and all these scientists were going to educate the whole country, would she please help us celebrate it on TV if we succeeded? And she said "Of course! And who else would you like?" So she helped build the network too.

I phoned other people up and said that I and Lillian Fosch would like them to take part, and they said "Certainly, if you have already succeeded at doing all that, I will take part!" Then I went to the department that governs national education issues and said that I and all these artists and scientists from the Swedish universities would like to put on this educational campaign, and would they like to have it distributed free to the schools and take part when it hit the whole nation? And they said, "Well, that's very exciting! Certainly we would like to take part in it."

So *then* I went to Swedish TV and said that I and all those artists and scientists and this big governmental office wanted to educate the whole Swedish people, and we would like to have a party on TV celebrating it. And they said, "Certainly. How could we refuse if you succeed with all these other things? What would be the best date?" The schools wanted the campaign in March, and I said the last day of April [1989] would be nice.

So, I had a date. From there I went to the king, and asked him if he would like to endorse the project. He agreed. You can understand that I slept worse and worse the longer I did this, because I was building a tremendous program without any money at all. I was *really* nervous by the time I approached the sponsors [funders]. But on the other hand, by the time they saw it, it was like a parcel with a ribbon on it. It was so concrete, with dates and everything, that they understood that if they didn't buy this now, this crazy chap would take it to someone else!

ON ENEMIES

As soon as we see an enemy, we ask him for advice. We say, "Would you please help us to sort out this problem?" When you get the answer, very rarely is it a threat to what you want to do. And when you ask him for advice, you learn the true background to his attack - it is generally that you have simply forgotten his cousin! Very rarely does he want to stop you from bringing about good powers to fight for the future.

But while it may not be what *he wants*, this is what *you feel*. In the beginning you feel, "This damn idiot. I'm going to punch his teeth in!" But

by asking him for advice instead, you learn that he was not a threat at all! And by *following* his advice, two things happen: first, he has part of the responsibility for it now, because it's his advice you are following; and secondly, the project generally improves - because most people have rather good ideas!

ON DEVELOPMENT AND INDUSTRY

What the Third World needs is what we need: cyclic technology. But that can only be developed by a handful of countries: Switzerland, Germany, Sweden, Japan, the US and so forth. This is the main task of those countries and their industries. If they only clean up their *own* exhausts, we will all die together for sure, because then the Third-Worlders will do the damage for us - the Chinese and the Indians will start to pollute as we do, the rainforests will be destroyed, and that will knock out our possibility to survive.

So industries must move from defending themselves to being heroes, ahead of everyone else, fighting for tomorrow's market and tomorrow's technology. In ten years the market will be about *nothing else* but sustainability. Whether you are a commercialist or a Florence Nightingale, the answer is the same: close the cycles, and you will be the winner tomorrow.

This is what we are teaching industry, and they buy it. We give them a crystal ball by talking about thermodynamics, the building up of structure, how the structure is the basis for economy, and how the tearing down of structure is deteriorating the economy. We also tell them in practical terms how the costs appear, and they agree - they have seen all those costs already.

Since this is non-negotiable, there are only two alternatives: either we choose to close the material cycles in society with high heads and in pride, or we do it crawling on our knees later on. But we will still have to do it. My life will be worth something if I can speed the process up a little, so that we can do more of it standing up than crawling. If I can speed the process up a few minutes, that's all that is necessary for me.

ON NETWORKS AND DEMOCRACY

This [networking] will probably be the future solution of how to work. It will probably develop into something much better than we have been able to do, because we have all this experience now, and somebody will improve on it.

Democracy is the best political form we have because it hinders idiots from coming up [and taking over]. We need it to protect ourselves. We don't have anything better. But there are serious limitations in the traditional democracy, so people with skills and knowledge must join and help democracy. If they don't - if they ask the decision-makers to do the job for them - it will die.

We have serious problems - AIDS, criminality, drugs - and people will

realize sooner or later that democracy can't solve these problems if we don't *support* democracy. So I think network structures will be like flowers on the field very soon.

ON MAKING CHANGE HAPPEN

I don't believe that the solutions in society will come from the left or the right or the north or the south. They will come from islands within those organizations, islands of people with integrity who want to do something. They will expand and they will become more and more powerful. It's like the Trojan Horse - in a big oil company, for example, I *know* that there are people with integrity who think about the future, who want to protect kids, who would like to do something. We can use their skills to do something *within* the company. We educate them, when we find them.

This is what a network should do - identify the people who would like to do something good. And they are *everywhere*. This is how the change will appear - you won't notice the difference. It won't be anyone winning over anyone. It will just spread. One day you don't need any more signs saying "Don't spit on the floor," or "Don't put substances in the lake which can't be processed." It will be so natural. It will be something that the *intelligent* people do, and nobody will say that it was due to The Natural Step or your magazine. It will just appear.

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