

# Introduction

## **Brenna Donoghue:**

After a day of discussing how we can influence policy, how we can help to change corporate behaviour. To introduce you to a man that Times magazine has declared one of 100 most influential Americans in the last century. Ralph Nader first came onto the public spotlight in 1965 when he published his book, "Unsafe At Any Speed". It was a work that exposed the car industry and put corporations as responsible to the safety of consumers. This book helped to influence legislation and create some life-saving legislation in America. Nader built off this momentum from there. He worked with lawmakers to create the Occupational Safety and Health Administration, the Environmental Protection Agency, and the Consumer Product Safety Commission. He has helped to draft numerous laws to establish many citizens' groups, and all of these to protect the interests of individuals. Yet he's most well-known for challenging the American political system, and the two-party system that has dominated for so long. In 1996, he organized the Green Party's first presidential campaign, and on a campaign budget of only five thousand dollars, received 700 thousand votes.

*\*applause\**

And only four years later, he received 2.8 million votes, helping to change the face of the duopoly that had dominated America for so long. With over 40 years dedicated to driving change, I think that Ralph Nader has a great deal of knowledge and passion to share with us on our quest to change the world. So it is with that that I'd like to introduce you to Ralph Nader.

*\*applause\**

## **Ralph Nader:**

Thank you very much, Brenna. Thank you all for inviting me here. I'm gonna pack a lot in in this hour, and if I were you and you were me, I'd take notes, *\*laughter\** Okay? 'Cause it's hard to remember it all... and if we can clear that sound<sup>1</sup>... whatever it is... we can get underway.

---

<sup>1</sup>Transcriber's note: 'that sound' is the sound of construction at the back of the room

## Speech by Ralph Nader

First of all, you should understand that you're a pretty extraordinary organization. You do have a counterpart in the States, but pretty much the engineering profession has not stepped up with its young generation to elaborate the standards of the profession in contrast to the hired skills of the trade. There's a very important difference between a profession and a trade. A profession is dedicated to preventing the very problems that the skills in the profession are equipped to deal with if there is a disaster. And so, doctors are supposed to prevent, to help prevent disease and trauma, and engineers are hoped, are supposed to prevent collapses of buildings or bridges, or other types of systemic failures. The second indication of a profession is it's a learned profession. A plumber does good work if the plumber is skilled, but you can't say it's a learned profession. It's a learned profession in the sense that it keeps self-renewing itself, keeps up to date on new developments, understands the importance of history, broadens the frame of reference of itself as it relates to other professions and other problems. The third characteristic of a profession is its independence. And this is where the medical profession, the legal profession, the engineering profession, have lost a great deal as they have become largely employed by corporations, ever larger multinationals. And what that leads to is a pattern of endemic self-censorship, where people in corporations who are lawyers or physicians or engineers keep quiet. They don't stand up to falsehoods; they don't stand up to abuses; they keep their mouths shut; and they get along by going along. More and more of these professions are simply subordinated to the dictates of corporate priorities and corporate power. Now we do want to recognize that as you come up into the profession, that you are not given a false choice, that you're not described as a professional, but basically you are a well-paid indentured servant. We saw that in the space program, in NASA, where very few of the engineers, and those that did were heroes in my book, blew the whistle, and blew the whistle in time to head off some disasters. Where they didn't blow the whistle, there were serious failures, as we all know. So keep that in mind, that whatever you do, you have to maintain the tradition of public service, of independence, and of being a learned profession.

Having said that, I like the comment — I think it's attributed to both George and Parker — that Engineers Without Borders, quote, "is bursting with talent and passion." I like that. That assumes it's bursting with knowledge and skill, and it takes that next step, because without fire in your belly, your intelligence will be curtailed in very narrow tunnels. It may be very profitable, for you and for your employers, or your clients, but after a lifetime of doing this... let's say you got 15000

days before you turn 65, or a little over 2000 weeks — the last weeks go quickly; you haven't seen anything yet, ask your parents — then you look back when you retire at 65 or 75, or you're bionically advantaged by then and you retire at age 90... you don't want to look back and realize that you missed the justice train. You missed applying your skills in furtherment of the betterment of human beings, and the biosphere around the world.

And so having said that, let's get down to more, to particulars. The one thing I noticed in reading all the materials that I was given about your organization is that you're under very few illusions. Most professional groups are full of illusions and myths. We characteristically call this the language of avoidance. Like years ago, I would go to a gathering of automotive engineers, and they would never talk about auto crashes. They'd never talk about safety. They'd never talk about human factors. They'd talk about the mechanics of the automobile, the quality of brake fluid, and so on, but they wouldn't talk about what really was their principal mission, which is not only to produce automobiles that got you here to there in a reliable fashion, but got you here to there safely, without pollution, with fuel efficiency and ease of maintenance and repair. So I do notice that you are aware of lots of dimensions, some of which you've entered, some of which you haven't been able to enter yet that include engineering challenges but include all the challenges of the human mind, behavioral challenges, dictatorial regimes, lack of economic priorities, lack of support by certain governments, and on and on. So in order to, I think, facilitate the kind of work you're doing, it's a good idea to analyze what works. What has worked among developing societies — to use that phrase — what has worked among indigenous Canadians, for example, to start with. How has it worked? Why has it worked? What has worked in the third world? How has it worked? Why has it worked? If we don't study what works, it's harder to find out how to make something that doesn't work work. Like in the war on drugs, they talk all about the young people who are addicted. Well, most young people are not addicted. So how come most young people are not addicted will give you an idea into how to deal with the minority who are addicted. So we have to study success models. Now, it's not like we're overwhelmed with them. When you have 3 billion people in the world trying to make it on 2 dollars or a dollar a day, and with your focus on Africa, there certainly is a paucity<sup>2</sup> of what has succeeded, but what has succeeded has not very much to do with the World Bank, the IMF, and the structural jusfit<sup>3</sup> mode of development that Western institutions have imposed on

---

<sup>2</sup>Transcriber's note: paucity = lack

<sup>3</sup>Transcriber's note: I don't know what this word is.. it could be an acronym, JSFT, standing for JCI (Joint Commission International) Health and Safety Department?

those societies, often in collaboration with highly autocratic regimes and domestic oligarchies. Which is why I recommend this book to you that came out about ten years ago, called "Africa's Choices", and it's subtitled "After 30 years of the World Bank." And what this does is go through what's really happening in Africa, which can be quite encouraging in terms of models of success here and there that have to be diffused much more broadly. And it's the concept of diffusion that takes you from successful episodes of charity into systemic patterns of achievement by and for the people who live there.

Now, a society that has more justice is a society that needs less charity. And I know that charity has its importance. People need help now, at the level of painful syndromes. But if we just focus on painful syndromes, say the victims of malaria, TB, AIDS, hunger, severe malnutrition, land erosion, we won't get to the systemic causes. Involving oneself in charity also sharpens your own moral standards of urgency. It leaves an indelible impact on you. But if you don't move to systemic justice, advocacy, many of you will burn out. You'll be demoralized and discouraged. As was the case with a lot of people in our respective countries in the 1960's. You've got to move to systemic justice. And I know that you're perfectly aware of this. I started two groups representing my alumni class at Princeton, and my alumni class at Harvard Law school. And, we made sure that in the charter of these groups, we were gonna put in the purpose of these groups is systemic justice, and it is really hard to stick to that when you can see and feel the pull to go into charity.

So, recognizing it is two stage: you recognize the concept, and then you will yourself into this very very challenging, intellectually rigorous, exercise of developing modes of systemic justice to implement. Along the way, it helps to have small victories. Small victories may be charitable victories. It may be reducing a village's incidents of morality — *\*laughter\** excuse me, malaria — with bednets. And that's what's happening now, actually, in parts of Africa. Some people in the States are saying "look, we can't handle this in the big scale; let's just take a few villages and see if we can reduce it to a very small incidence." Small victories are very motivating; it keeps people going. It's also very very much of a learning process. But we obviously can't be satisfied with small victories, when you have three and a half million people who have serious tuberculosis and malaria in the world every year. We can't be satisfied with small victories, when in spite of modern medicine, in spite of spectacular modern medical knowledge, more people in this world died from tuberculosis than any other year before that. It just gets worse. It is very sobering to know the gap between knowledge and action. The gap between knowledge and action for human betterment is a reflection of the democracy gap. It's a reflection of the few making

too many decisions for the many, controlling too many resources of the many. It's a reflection of the merger of economic power and government against the public will and wellbeing.

Sometimes people are very satisfied with just discovering knowledge. They're called theoreticians, or even empiricists. Economics has been called "the triumph of theory over fact," which is actually a very good working definition. And so I would recommend that to equip yourself for your mission — and I assume your mission is not a normal one, that you are not only going to put your arm to the wheel of justice, standing on the shoulders of those who came before you and gave you what you like about life in Canada, about its democratic practices, about its sense of commonwealth, about its safety net — much of which is under erosive attack, as it is in our country — about its operational opportunity to define freedom a little bit the way Cicero did over two thousand years ago in ancient Rome: freedom is participation in power. One of the best definitions I've ever heard. I don't know how he did it. He had no email. No internet.

In order to equip yourself, you have to develop a civic personality. Now we know what an athletic personality is. You can take ten of the best hockey players in the NFL — er, NHL, rather *\*laughter\**— and — got the championships on our mind here — in the NHL, and they might be physically equal to one another, but there's always one or two who rise above it, because beyond their civic skills, they have that will to win in the final minutes. That's what characterized Michael Jordan. That's what's called an athletic personality. A lot of heart. Now a civic personality, is one who has not only skills, and it's important for you to look at your curriculum back at your universities, and establish civic skill courses, not just traditional civics, which is a memorization game, but actually how do you make things happen in a democracy? What skills do you need to develop coalitions to use for your information act? To refine litigative strategies? To learn how to lobby? To learn how to diffuse voting records so everybody has them for your MPs at your fingertips. All those and many other skills should be part of the curriculum of your university, even if you're not a government major or a social science major. Especially if you're not a government major or a social science major, because we're all supposed to be engaged citizens, are we not.

Beyond that, are these personality traits which if you don't already have, you gotta work at it. One of them is to learn to share the credit. Even if you're sharing more than you think you should. That is very, very important for leadership capacity. The second is to learn how to avoid being discouraged and demoralized. As my father used to say to us, "Your last mistake is your best teacher." And you can say your

last defeat is your best teacher. You have to have a resiliency in order to persist, because look what you're up against. You're up against obstacles that everyone in the history of the world has not really been able to surmount in a majoritarian way for the world's population. The third characteristic is that you keep up to date and keep learning. You may think that you're way ahead of most of your peers, and you are, in terms of your sensitivity, your priorities, your vision. You wouldn't be here if that wasn't the case. Do not rest on your laurels in that kind of comparison, because you've got another comparison, namely that we are all amateurs in the practice of democracy.

When you look at the nature of public protests in Canada and the United States, against globalization, against toxic contamination, against this, against that, it's like they were around centuries ago. It's demonstrations, marches, picketing, protesting, what else is new. Aren't we entitled to some innovation? Aren't we entitled for, into something other than saying well, now we have the internet. *\*chuckles\** We can get to a lot more people. Yeah, you can get terrific information about events and marches on the internet. You can retrieve all kinds of information that you need to make a case for your drive, but the verdict is still out as to whether it really motivates people to action. It's too cold a medium. I'd much rather speak with an audience this size than try to reach an audience forty times larger, if I wanted to get something going. It's just biological. It's too cold. Too cold a medium. It's also too inundating; there's too much of it. And it tends to atrophy the focus. It's too easy to be overwhelmed with bits of information. But bits of information do not have a dynamic unless they are connected together to something called knowledge, which is then connected together to something called judgment, which is then connected together to something called wisdom. How often do you hear the word wisdom? Or thrift? They must be lonely entries in our dictionary. We have to bring them back. So work on this civic personality. Because three, four, five, six years into this kind of work, whether you do it full time or volunteer or part-time with your more traditional positions — and all these versions are important — you don't want to get discouraged and burnt out. Our respective countries are full of people who started out energetic, idealistic, pragmatic, determined. And what are they doing now? They've been burnt out. They're working for some insurance company, developing new instruments in sub-prime mortgages, *\*chuckles\** or working new graphical interfaces for the advertising industry. They burn out. They were discouraged. They didn't develop a consciousness of what is needed to develop and evolve a civic personality.

People say to me, "What keeps you going?" And I say, boy, I never ask that question

at all. Can you imagine what the alternative is? *\*chuckles\** What's the alternative? A white flag? Surrender? Throwing in the towel? What's the alternative? Being part of a large number of people when they're asked at the same time, by someone with a megaphone, what's the difference between apathy and ignorance, they roar back "We don't care and we don't know!" *\*laughter, applause\**

Science and technology. Your profession has out-raced science. And I know there are a lot of people here who aren't engineers; we can get to that delicate subject later, in the question period. *\*chuckles\** Look at the areas of harm to humanity when engineering outpaces science. Science discovers, engineering moves it into practical application. However, we went with the motor vehicle for sixty years, engineering, before the scientists, largely Arley Augenschmidt <sup>4</sup>, a professor at CalTech, who discovered the connection between automotive emissions and photochemical smog. Engineering outraced the science that should have been its governing discipline. 'Cause there weren't structures of regulation, structures of accountability, years and years ago. B— (Basekey?) <sup>5</sup> said, "Auto companies, you've got to put your engineers on emission control, on developing new kinds of combustion engines, etcetera." And the departments of engineering at MIT, at Rensselaer, at Caltech, weren't particularly on the job here, as well. They were busy consulting with the industry and keeping their mouths shut on these larger demands that should have been made.

Biotechnology's another example, where they're now deploying genetically-engineered seeds in the ground, millions of acres, even though a number of very important scientific questions have not been resolved. From how they connect with the larger ecosphere, from migration of these plants into other areas of farming, and many other concepts that await an advanced science. Another example of course are the normal industrial plants, who basically produce goods, many of which were very much needed, but look what they can put in the air, in the water. Because they would say to people who would say 'You know, this stuff is makin' me feel sick. You know, I've got respiratory problems, maybe cancers,' they'd say 'There's no connection. There's no proven connection between all these pollutants,' because science did not early enough resolve those connections. The resources were not provided and other inputs were not there.

And so it's important to make a distinction between academic science and corporate science. Academic science is much more heavily peer-reviewed than corporate science. Academic science is often driven by more noncommercial humanitarian goals than corporate science. Academic science is not as powerful politically. As Mon-

---

<sup>4</sup>Transcriber's note: this name is probably incorrect

<sup>5</sup>Transcriber's note: this name is unidentifiable

santo's version of corporate science. And when corporate science begins moving into the universities, and corporatizing the universities, that freedom of inquiry, that rigorous peer review, that wonder about research might not be commercially viable, but it just may be extremely important, for the public health is subordinated. *\*applause\**

And of course the same is true for academic engineering and corporate engineering. I came across that so many times, where whether it's highway pavement, you don't think there're academic engineers who know how to build highways that require virtually no maintenance? Highways without potholes? Highways that don't break up in heat in the summer, or in the frigid temperatures of winter? But the asphalt and cement industries, for a variety of reasons, did not want those kinds of highways; to be sure they cost more at the beginning, but they save far far more in terms of the horrendous maintenance problems, where you have interstate highways in the US and so on that get crumbly in four years. Not to mention the impact on axles, waiting times, gasoline waste, and so on. Always keep that in mind.

Keep also in mind this amazing finding by the UN development people that for forty, fifty billion dollars a year, all the people in the world could be given clean water, basic nutrition, and minimal health services. Now whenever I hear a figure like that, I say "that can't be true." That's just too little. But then I learn what some of these CEO's are making, what some of these corporations are making. That happens to be about what Exxon made last year, Exxon Mobil. One corporation. And so, that is a great source of optimism. And we know intuitively that we can reduce the millions of lives lost, especially children. From traditional diseases that we have prevented in this country, like measles, diphtheria, tuberculosis. We know that we can provide clean drinking water — 'we' being the world — we know that the allocation of public funds qualifies clinically for the definition of insanity. Just think, half of the US government's federal operating budget are military expenditures. There's no more Soviet Union! It disintegrated fifteen, sixteen years ago. That's what the budget was for. Communist China? They want our industries and jobs, they're gonna send missiles over here? They're helping us build missiles! Through outsourcing. *\*laughter\** *\*applause\** So when someone ever tells you that there's not money for this dire necessity, for millions of children and adults, you just steer them back. Steer them back to the way public budgets are allocated. And the Bush-Cheney regime is pressuring your Canadian leaders to put more and more money into military expenditures, although you've resisted, decreasingly so, to the admiration of some of your friends south of the border.

This is put out by a group for sensible priorities. *\*holds up paper/booklet\** I know

you can't see it all, but, I'll explain it. This is the military expenditures in 1999 by the US and NATO allies. Okay? Can you see a little bit? And the rest are by China, Russia, and the so-called Rogue States. Now there's one update. You know what the update is? This is now double. Since 1999. Used to be three hundred or so billion, for the US, it's now over six hundred. Billion. Crowding seven hundred. Billion. Go right into the, shall we say, the inner modal analysis of public revenues, and see what they're used for. Corporate welfare, subsidies, handouts, giveaways, which Canadian governments and US governments have expanded, are in the hundreds of billions of dollars a year. They come with straight-out handouts and disguised tax expenditures or tax loopholes, bailouts, etc. If you're a big enough corporation in North America, you get in trouble due to corruption, mismanagement, or excessive speculation. You don't go bankrupt, you go to Ottawa, or Washington D.C., for a bailout. The only real capitalists left in our country are small companies. They are entirely free to go bankrupt. *\*laughter\** To meet the market test of success or failures. But that is a huge diversion of money, very dubiously spent in most cases, from the necessities of human beings. From the necessity to foresee and forestall, which is one of the heights of preventative engineering.

I got into this years ago when I was about your age. I used to hitchhike back and forth to university; I found public transportation too tedious. And I would come across crashes — the truck drivers, me in the front seat — would come across crashes, sometimes before the police and emergency services. And it was just, it was just, like, devastating to see. And hear. The broken, bloody bodies, severed limbs, burnt flesh, the cries, the screams. And at first, it was, you know, I just, just accidents, right? Imagine calling crashes, accidents? As if it's beyond the outer realm of our knowledge to do anything about them? We now refer to them as 'motor vehicle collisions,' in order to put 'em on neutral ground and analytically take them apart. Epidemiologically human factors, and so on. But I had a curiosity; I had a lucky choice of parents who imbued me with curiosity. And what curiosity does, is push you to the next mental step. To the next practical step. So I asked myself, "Gee, you know you see this steering column rammed back and up in a collision?" I said to myself, "Why does that steering column have to ram back?" Or, people ejected through an open door? I said, "Can't they build locks that keep them in?" Because the proverbial pile of hay is not always there, right? For an ejection? You increase your risk of death fivefold when you're propelled from a car on hard pavement. The next step was, "Gee, don't the engineers know how to do this?" And the next step was, "I wonder where I'll find out what the engineers are doing." Well, I couldn't get anywhere asking the engineers in the auto industry; they're muzzled. This was a period where stylistic pornography prevailed over engineering integrity. Where the

stylists had the resources in Detroit with these great styling salons to style the car — you know, a grill pattern grinning one year, grimacing the other — trivial stuff, while the engineers had virtually nothing in terms of crash test facility.

So I went to the universities: MIT, Caltech, universities in Michigan. "What are you doing?" "Uh, what are you doing? That's not our area of research." What? This is the biggest operating engineering phenomenon in the United States, the highway-driver-vehicle matrix, and you're not doing anything? "Well, lead me to the department of automotive engineering," I asked the receptionist at MIT, and she said, "There isn't any." There isn't any? "Well, do you have a PhD program in automotive engineering?" You know, they have PhD programs in everything. "Oh no, no, we don't," she told me after she made some inquiries. So just for fun I said, "Well do you have any PhDs specialized in the geological substructure of the Rocky Mountain area?" "Oh of course." *\*laughter\** Because the oil companies wanted that kind of skill. But the auto companies, they didn't want graduate engineers in the automotive area, who had their own ideas about the deficiencies of automotive crash injury design, or fuel efficiency. They wanted to hire the engineers, as the GM Engineering Journal prominently put it, "We want to hire the graduate engineers and teach them the industry way." ...which is stagnation. And subordination.

So my curiosity extends. So I stumble on some interesting research by doctors and public health specialists. What? In automotive crashes? Yeah. Doctors would write medical journal articles, and they'd say the best cure for a crushed skull in a auto crash is prevention. Otherwise known as padded dash panels, seatbelts, collapsing steering columns, etcetera. And then I went to the Harvard School of Public Health, and Cornell Medical School, and they were working on this. And I said, where are you gettin' your money from? They said ... — I said, "You gettin' your money from the auto industry?" "No." "You gettin' your money from the department of health?" "No." "Where are you gettin' your money from?" The Pentagon! Because the Pentagon realized in the '50's, during the Korean War, they were losing more Air Force men on the highways in the US than they were in Korea! *\*laughter\** So they threw a four, five million dollars — you know, say twenty, thirty million today, inflation adjusted — and those were the documents that I used, among others, by going to Detroit, getting some engineers in the car, driving around the airport, incognito, while they gave me inside information. Imagine they had to do that to fulfill their engineering professionalism, their engineering ethics. That's when I wrote "Unsafe At Any Speed." And GM got early copies of it from my publisher in New York. It turned out they had heard of what I was doing, they hired private detectives to follow me, to track me, to go to my classmates and my teachers under some pretext of wanting to employ me. And they'd ask 'em the questions, you know,

"This is a pre-employment interview." Yeah, I was really going to work for GM. *\*chuckles\** Then they followed me to the US Senate Office Building. That's where they got in trouble. The cops caught 'em, the detectives, traced it back to General Motors. There was a huge hearing in 1966. Within six months, federal regulation as a giant industry was signed into law by Linden Johnson at a White House ceremony. I saw this as a way to liberate engineering talents in the auto companies. And to be sure, the status of the automotive safety engineers started rising in Ford, Chrysler, General Motors, because they had to meet higher federal motor vehicle standards. They had to recall defective motor vehicles. So it's that trail of curiosity. Don't let anything, or anybody, deaden your trail of curiosity. That's what takes you to the next step.

Now in terms of what I understand you're trying to work with people in Africa. Let me make a few comments. It's very important first to understand the corporate model for developing countries. In my judgement, for a variety of reasons, which don't have time to elaborate, is a very bad model. It induces inappropriate technology to be adopted. It induces dependence on the West. It induces a process of sucking the scientists and engineers out of these countries to bring 'em to Canada and the United States in a colossally damaging brain drain that a lot of companies are completely insensitive to, including Microsoft and Intel. It includes a contempt for the genius of the peoples of the third world as if all they have to learn is from the World Bank, and from the IMF, and from consulting firms, when the greatest advances in the third world — microcredit came from the third world, not from the World Bank. When the ability to build elegant small houses on the soil under the feet of Egyptian peasants came from an architect in Egypt called the people's architect. When the greatest technique in abolishing illiteracy for illiterate Brazilian peasants came from Paulo Freire in Brazil. The kind of contempt, the kind of bureaucratic language, that you read in books and reports and studies of the West, vis a vis the third world, is inspired, in part, by a lack of empathy, a lack of anthropological knowledge, a lack of indigenous traditions, a lack of naked science that may not be peer-reviewed but it is thousands of years old in those countries, and above all by an aversion to upset the large multinational corporations, the financial companies, the extractive industries, etcetera.

And if I have one criticism of the materials that I've read: Be very, very wary of 'bureaucrat-ese.' Be very wary of adopting the tired, abstract, formal language of economic development. And I notice that, in some of the materials, there were flashes of your own language. Develop your own language. Do not use the word... — the word, "capacity development." Boy, that's a beauty. Capacity development, that's a new one. One thing about bureaucratic language is it does innovate a bit. Why don't

you call it 'community self-reliance?' Isn't that better than capacity development? How about 'coordinators?' We need more coordinators. Don't call your coordinators 'coordinators.' Call them 'dynamos,' so they have to answer the phone: "Dynamo number one!". *\*laughter\**

A good way to come down to earth here is to read this book, "Small is beautiful", by E.F. Schumacher. How many of you have read that? That's almost required reading. He's an economist who passed away too early; I guess about twenty, twenty-five years ago. But he's an economist who subtitled the book "Economics as if People Mattered." And he's known now to his students and disciples as the best articulator of appropriate technology.

And you have some examples of appropriate technology in your materials. The simple diesel engine mounted on a steel chassis that can power a variety of equipment such as grinding mills, water pumps, battery chargers. Since the women own and operate the platform, not only are they able to reduce their daily burdens, and are they ever burdens, by mechanizing food processing, but they're also trained in technical, financial and social management of the platform, and earn an income by charging other community members a fee for using the energy service. When you're in a little village like that, it's hard to rip people off, by the way. There's a certain accountability that operates. And of course as other consequences, solar digesters. Simple solar digesters, of which there are many in India and spreading into Africa. Appropriate technology in the third world is not nuclear power. It's not nuclear waste. It's not the madness of having a perilous nuclear fuel cycle whose only purpose is to boil water to produce steam, when you have solar energy raining down on these countries. When you have solar energy that has been used in east Africa for centuries; for air conditioning, wind power, cool winds from the sea, through tunnels. When you have architectural passive solar built by the ancient Greeks and the ancient Persians. When you have all the practical applications that are proliferating by many small companies in North America, and Asia, and elsewhere, developing them in Africa. Solar energy is something that's not seen as a foreign import. It doesn't come with structural adjustment. It doesn't come with technologies whose spare parts and maintenance make you dependent on Western countries who can become embargoed, or who can become retaliatory if they don't like who happens to win elections, or take over. These are parts of what Clyde Kluckhohn, the anthropologist, once called "development practices that are in tune or do not offend the normal culture rhythms and cultural traditions of the indigenous peoples in those countries."

Some people may say to you, why are you focussing on Africa? There are plenty of poor people here. Why don't you stick to home? Well, you certainly could find fertile fields here in Canada for your work, but one argument for focussing on Africa is that now it's not just one world idealistically; it's one world empirically. If we wanna really get self-interested about it, the neglect of Africa will have disastrous environmental consequences, infectious disease consequences; we've already seen AIDS. It will have very serious consequences in terms of how bacterium and viruses mutate. If you wanna really get somebody here in Canada who says what are you doing in Africa, just to give you a few examples of the interrelationship of the continents.

How many of you have heard of Ashoka? Oh, very good. Very good. Now they, they should, maybe they're working with you, what this — this started out, there was an environmental protection agency official who retired when Carter was defeated and he started Ashoka to recognize local leaders in the third world who already were underway in all kinds of health, economic, agricultural cooperatives, appropriate technologies, various kinds of services for the poor, education, and he'd identify them and then support them. He'd give them some money, he gives them some backing, he'd connect them with other people, groups around the world. And now he has a big program operating in the US. Anyway, that is, that is a very good group to connect with.

Another group are the PIRGs here in Canada; anybody remember, know, the PIRGs? Public Interest Research Group? Well, we helped develop them, and there are now PIRGs in British Columbia, New Brunswick, Quebec, Ontario, and, believe it or not, Alberta. *\*laughter\** And Alberta actually started it very quickly. And a person who was very instrumental in starting it with me was, is, Duff Conacher of Democracy Watch — have you heard of Democracy Watch? Yeah? In Ottawa? He has done more out of his own work than anybody I've ever seen in North America in concentrating on the ways to strengthen a democratic society, of government ethics, and as a hobby, riding hard on banking abuses of consumers.

Now, it would be good for all of you to get together in a national conference, as soon as possible, including other groups, other student groups, so that you appreciate more than intellectually the importance of aggregation. The importance of taking unit one, unit one, unit one, unit one, unit one, and put it together, it's more than addition. It's aggregation. It's morale building. It's contacts. And, while you can have a conference of your members here, imagine if you have a conference where you have seven or eight other groups with university students in membership. And we'd like very much to help with that.

Another connection that you can make is what are little engineering groups doing that you might not have heard of. I once gave a speech at Oberon College in the

early '70's, and as I was walking out of the auditorium, I heard wheels behind me. I turned around. It was a young student — he was a junior at the time — who was a paraplegic from a bicycle accident, and he was trying to catch up to me, and he said "Can I go to Washington and work with you in the summer?" And I said "Well, of course," we have hundreds of students, right, that's the future. And so he came to Washington. And his beef was that the Jennings corporation monopolized wheelchair industry in the world out of England, and wheelchairs were very overpriced by his criteria, and very poorly designed. And he had a lot of ideas on how to design, at a cheaper level, a wheelchair. And so he would never patent it; they would all be in the, what is now called open-source domain, and he started an group called Center for Concerned Engineering. And after a few years, he went to San Francisco State University. And he travelled all over the world — imagine, by himself, in a wheelchair — Central Asia, Guatemala, Vietnam, and taught people, using local materials, how to build wheelchairs. Now, a wheelchair in the third world is a lifesaver. If you're a paraplegic or a quadriplegic and you don't have a wheelchair and other equipment, it's almost a death sentence. And he estimates there are now twenty-five to thirty million people who need wheelchairs. And he now has a shop in San Francisco State, and he teaches people in these countries, many of them women, in how to build their own wheelchair shops. Now he's built wheelchairs that do everything but fly. You know, most wheelchairs in the US are built for flat-surface, like a hospital floor, but in the third world, there are kind of pathways and bumps and so on. You want a rugged wheelchair. And that's why he calls his group "Whirlwind Wheelchair." And you can google it and find out more of what he's doing.

Now there needs to be a lot of discoveries of groups like — how many of you have heard of this man, by the way, his name is Ralf Hotchkiss — see, there are a lot of groups like that, with a track record that can be of immense collaborative importance to you.

Now, let me just conclude on some of these notes here. How many of you have heard of the book "Canada First?" Okay. Someone back there? Okay. This is one of our books. We come to Canada, we say "Canadians, you know, you don't appreciate yourself enough. You've got this inferiority complex to this giant to the south. Let's hear where Canada was first." People would raise their hands, and it'd never get past fifteen or seventeen examples. You know, hockey, and some drug, and so on *\*laughter\**, penicillin or whatever, and, I mean, they were all pretty important and you know, you could... one said Pablum, and so on. And I'd say, "How about more?", and it wouldn't get there. So we decided to do a book with Duff Conacher and Nadia Milleron, called "Canada First". We couldn't find a single publisher in Canada to publish it. We'd say "Why?" He'd say, "Canadians aren't interested in where they're

first. They're too modest." I said, "That's why we're doing the book! Didn't you read the introduction?" *\*laughter\** I mean, you know, if we had other priorities, we'd go to Texas, they'll give you five thousand; only a hundred in Texas, you know. So we finally found on the second round McLellan and Stewart, a publisher, and it became a best-seller in the early '90's for forty-three weeks. You should look at that book and ask yourself, look at the innovations of your country-people, and compare them in terms of how fundamental these institutions were. You know, there was a time when Canadians — long before Jean Monnet, one of the founders of the common market, said "Without people, nothing can happen. But without institutions, nothing is lasting." — and long before he said that, these Canadian forebears of yours built institutions. Credit unions. The first daily newspaper. The first daily radio station. All kinds of institutions; from the west to the east, from the prairies to the maritime provinces. That's a very highly motivating read, and I urge you to do it.

The other thing I'd like to say, is that you are up against probably the biggest challenge anyone can take on. You're up against people who you want to do things with your help in the field who may have twenty-three feet of worm in their gut. Who are in incredible pain from malaria or tuberculosis. These are people who don't know what 'not pain' is, day after day. Which is why more and more people are saying that preventive health on malaria, AIDS, other diseases, TB, are a major factor in economic development. How do you go to work? There are people in our countries if they had a headache, they'd call for sick leave. How do you go to work with that kind of debility? And it's very very widespread, at different gradations, never mind hunger, never mind malnutrition, never mind brittle bones that break in manual labour because of malnutrition. So you're really up against it. You're up against regimes that will go along with certain disease eradication programs, clean drinking water programs — that doesn't threaten them — child mortality, infant mortality reduction programs. Jim Grant of Unicef is a great hero in that, going negotiating with dictators, saying "You know look, I'm not interested in overthrowing you guys, but we have a common interest in the children of the country," so they let him in. But let's face it. When it comes to reallocating public revenues, when it comes to reducing corruption and payoffs, when it comes to freedom of speech and new ideas, when it comes to land reform, when it comes to dealing with certain tribal traditions about who can do this and who can't do that that you might not never be aware of, it's really tough. And that's why you need a very deep anthropological awareness. And by studying about the peoples you're working with. Many cultures will not tell you the truth. They're too polite. They keep nodding as you tell 'em things, but they're really disagreeing with you. Because to disagree overtly is not hospitable. It's gross. They're not introduced to US talk radio. So, in that respect, you have really

got to invent the future. You can read all the studies, all the development studies, that haven't been that successful. And I like a section that I read which I think is worth you reading, where, I think it was George, and Parker, said that "What you learn in universities in Canada, in terms of engineering, is not very applicable when you go to Africa." And they had three broad failure modes why projects are not optimally designed. So you're into it, I mean, that's why I say you're not surrounded by illusions. But that doesn't mean you've got the handle. And to get the handle, and to do it diplomatically in a area that you're not gonna live your life in, you gotta be inventive. And you gotta be aware that while the past is something you can learn from, it's a fraction of what you're gonna have to teach yourself. And that means you've got to not be strapped by some authoritative economic doctrine, or some way of doing things. Now technically, obviously, that's not as appropriate as in the economic area. Technically, there are such things as appropriate technologies that you can grasp and try to apply, taking into account the knowledge of certain customs. You try to drill a well in an area that might be sacred, and you don't know it, and you say "Yeah, we got water in here, yeah," and before you know it, you've got a riot on your hands. So you have to be very sensitive to that. But go into these things really thinking that you're pioneers. Not just in terms of the paucity of your numbers, but in terms of the necessity of what you have to learn from them, with them, by them, for them; the genius of the peoples in the third world.

I have a nephew who's working in Southern Venezuela, tropical forest, and what he learned is there are a number of older natives in that area who have incredible knowledge about the forests. And he's trying to get it down on tape, and get it down so that before it's too late. These are natural scientists, and they've absorbed through their curiosity, a level of knowledge far in advance of their peers. About thirty-some years ago, my sister, Claire Nader, and a collaborator, Tony Zahlan, had a conference in Beirut, called "Science and Technology in Developing Countries." It was the first of its kind. It's important to read that book — it's put out by Cambridge University Press — it's important to read that book, it's important to read books of decades ago, to ask yourself the question: "Why haven't we moved faster? Why haven't people been more impatient? Why haven't people been more creative? Why haven't they taken existing knowledge? Why haven't they rediscovered old knowledge, that may not be credentialed, in formal western terms?" My sister who, other sister, who teaches anthropology at Berkeley, edited a book recently called "Naked Science," 'cause she was a bit taken aback by this narrow, exclusive definition of science in western countries, as if these natives, they had no science because it wasn't a double-blind study. I mean, they navigated across the Pacific, but it wasn't subjected to a double-blind study. They used all kinds of raw materials with predictive and

replicative abilities; it was called "Naked Science," edited by Laura Nader, if you want to look at that, 'cause it has a lot of sections of anthropologists who've been in countries that you have been in or you will go in.

Now one last personal comment. In addition to searching for models that replicate themselves, not just models that are idiosyncratic, models that have a diffusive propulsion, which is a great way to define your contribution, you have to negotiate your twenties. Now, in North America, people in their twenties need to be much more self-conscious in the following ways. One, they have to get over personal hang-ups that they should have gotten rid of in their adolescence. Because you can lose your twenties, quote, "trying to find yourself." *\*laughter\** Trying to get in and out of relationships that are so difficult. When you have a mission that you are in now, your personal problems tend to dwindle in significance. When you have a bigger mission, a bigger frame, you're out to deal with the hopes and necessities and tragedies of the world. You're not gonna worry about keeping up to date upgrading your profile on facebook. *\*laughter\** The kind of narcissism that is infecting your decade, the second level of self-consciousness; this is your most creative decade. You will have more judgement, and wisdom, and experience, later on, in your thirties, forties, fifties, sixties, seventies. You are very unlikely to be as creative, as capable of asking the impertinent questions, of taking on the conventional wisdom, of plowing new forays for yourself, of vectoring your talents and your time as to what you want to do in life, as in your twenties. Do not waste your twenties. Be very self-conscious of the importance of those years.

Now we all know that's true for mathematicians, and physicists, and so on — I mean, so many of the great discoveries were by young scientists, Einstein for example, great mathematical theorems — why? Is it really the brain is at its peak? That's part of it, I suppose. But you know what else it is? It's when you're young, you don't know what you're not supposed to imagine. You don't know what you're not supposed to question. And every year you add to your lives, you will learn what you're not supposed to imagine, and what you're not supposed to question. Subconsciously, opportunistically, occupationally, inadvertently, or consciously, it'll grind you down. And how do you stay forever young as you grow older? You never allow anybody to erode your idealism. The greatest realism that has been created in this world of ours throughout history was overwhelmingly started by idealism. By a heightened sense of morality. By a sense of what human possibilities can be like.

Now back in 1966, I addressed your profession. Called the engineer's professional role, universities, corporations, and professional societies, and I gave it to George; I only have two or three copies, and I hope that they can reproduce it so that

you can read it, and one of the things it has in it is something most people are not aware of. That the ethical dictates of professional engineering, you know when they get their PA, or PE designation — you have that here? yeah — their ethical dictate is if a professional engineer in an occupation, in a company, comes across a hazardous condition, brings it to the attention of his or her superiors, finds that his or her concerns are ignored, or repudiated, is ethically obligated to go outside the institution and blow the whistle. Outside the institution to the proper regulatory or other authorities. What does that mean? That means you have a profession obligation that transcends your occupational strictures. And I want you, I just wanna read the last paragraph for you. "In Aristophene's play, the Birds" — and I hope that in your curriculum, you'll take some humanity courses, not just engineering; don't over-specialize, you'll have plenty of opportunities to resist that later —

"In Aristophene's play the Birds, an unbound Prometheus is shown to believe that he can escape the attention of Zeus by staying under an umbrella. Engineers can no longer operate under a comparable impression: that their activities will be shielded from the lay public, from severe scrutiny. This is partly so because engineers have shown the public how very much they can contribute to human progress. But progress frequently brings with it terrible cost, and the public is more and more realizing that something rather new, something rather new, that the engineering remedy to eliminate to diminish these costs, can be as impressive as the engineering achievement that developed the technology in the first place. It is the recognition of this gap between promise and performance that is producing the pressures which will continue to mount on the engineering profession, and demand that it assert itself toward its most magnificent aspiration, for so much of our future is in your trust."

And you have taken it to a new level here in Canada, with your organization, Engineers Without Boundaries<sup>6</sup>. We expect great great achievements from all of you, individually and collectively, in the future. Thank you very much.

*\*applause\**

## Questions - to be transcribed here

.....

---

<sup>6</sup>Not a transcription error! =(

We all have to learn from an ancient Chinese proverb. Once you hear it — it's over two thousand years old, which gives you an idea of the consistency of human frailty, human virtues, human wisdom, and human foolishness, regardless of the technologies; that's why we like ancient Greek plays, and Shakespeare. Isn't it interesting? Same old problems. Same old hopes. Here's the proverb — and once you hear it, you'll never forget it — now, like all proverbs, it's not hundred percent true, but it has a stunning, a stunning core of truth to it, and here it is. Quote:

”To know and not to do is not to know.”

End quote. ”To know and not to do is not to know.” And I think, learning about your organization — talk about learning something — I think that would be a good mantra for Engineers Without Borders. Thank you very much.

*\*applause\**