

Conversations with Emeagwali

By Nduka Otiono

Former secretary of the Association of Nigerian Authors.

At the University of Alberta (Canada), Sept. 23, 2006.

Published in *Share Our World*, a Celtec® magazine for mobile phone users.

Nduka Otiono:

In your Alberta lecture, you lamented the negative effects of brain or intellectual capital flight on Africa's developmental efforts. Is it true that for more than 18 years you have not visited your homeland, Nigeria? If it is true, what is Africa's hope (including Nigeria, of course) of benefiting from the expertise of gifted intellectual exiles like you?

Philip Emeagwali:

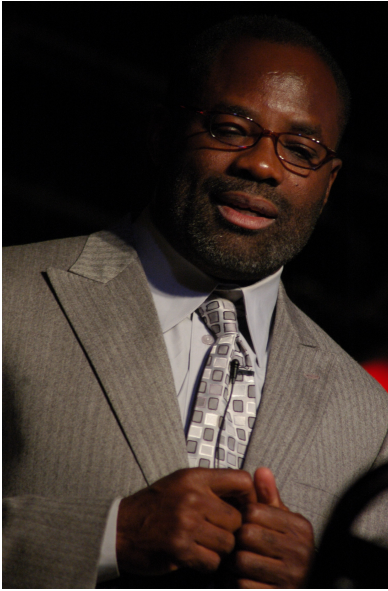
It's true that I left Nigeria 33 years ago, and my last visit to Africa was 20 years ago. My 16-year-old son and wife of 25 years have never visited Africa.

Despite my three-decade absence, I have been residing at the edge of knowledge and pushing the envelope of technology thus contributing to humanity, Africa included. I was the first scientist to prove that supercomputers with thousands of electronic brains called processors can be used to recover oil. For that achievement, *CNN* described me as a scientist who used his "mathematical and computer expertise to develop methods for extracting more petroleum from oil fields." This technology is used in Nigerian oil exploration. Globally, it is an eight billion dollar a year industry. Oil companies alone, purchase and use 10 percent of all supercomputers to discover and recover oil.

Nigeria rewards the oil companies that consume the technology that I produced. The oil companies received 40 percent of Nigerian oil revenue, or about 200 billion dollars. The Petroleum Technology Development Fund (PTDF) received billions. I received no compensation from oil companies or PTDF. I was not paid for 15 years of excruciatingly hard intellectual labor.

“How can I ever thank you?” gushed a woman to a lawyer who solved her legal troubles. “My dear,” he replied, “ever since the Phoenicians invented money, there has never been a better way to say thank you.”

All I received were commendations such as the one from *Upstream* [a European oil and gas industry publication, January 27, 1997] that called me an “unorthodox innovator [who] has pushed back the boundaries of oilfield science.”



Nduka Otiono:

Many admirers see you as a public intellectual, perhaps part of the reason you were invited as keynote speaker for the Unveiling Africa project at Alberta. What would you consider the role of the public intellectual in an underdeveloped political economy like Nigeria's?

Philip Emeagwali:

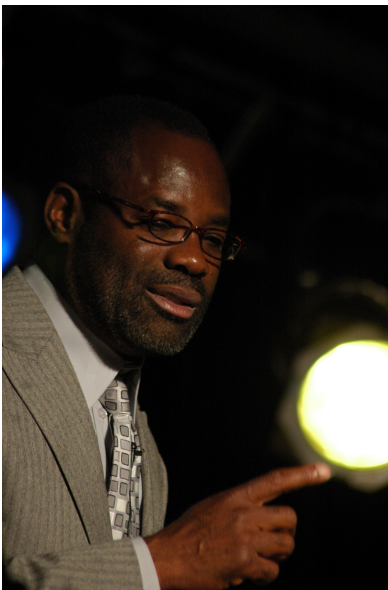
Public intellectuals are the eyes and ears of Africa. I communicate my ideas to Africa, not just to scientists. I might point out that Nigeria will soon be celebrating its 50th independence anniversary while still paying a 40 percent tax to Britain, the Netherlands, and the United States through their oil companies.

I will explain that the 200 billion dollars paid to foreign oil companies is a hidden “ignorance” tax imposed upon a country that lacks intellectual capital.

I will ask Nigerians: Why did you pay 200 billion dollars for the privilege of removing your lifeblood? Is it not more profitable to spend 20 billion dollars to develop your intellectual capital and then save 200 billion dollars?

A public intellectual will question the allocation of a mere 110 million dollars to create jobs — jobs for 110 million poor Nigerians. He will point out that’s only one dollar for every impoverished Nigerian, whose share of the national debt is three hundred dollars.

Nigeria’s 391 Confab delegates debated oil revenue allocation among our 36 states, and submitted nearly 200 recommendations. But the Confab delegates avoided debate on oil revenue allocation between Nigeria and the Shell Oil Company; they failed to recommend any way to reduce the 200 billion dollar royalty fee, which is likely to be demanded again by foreign oil companies.



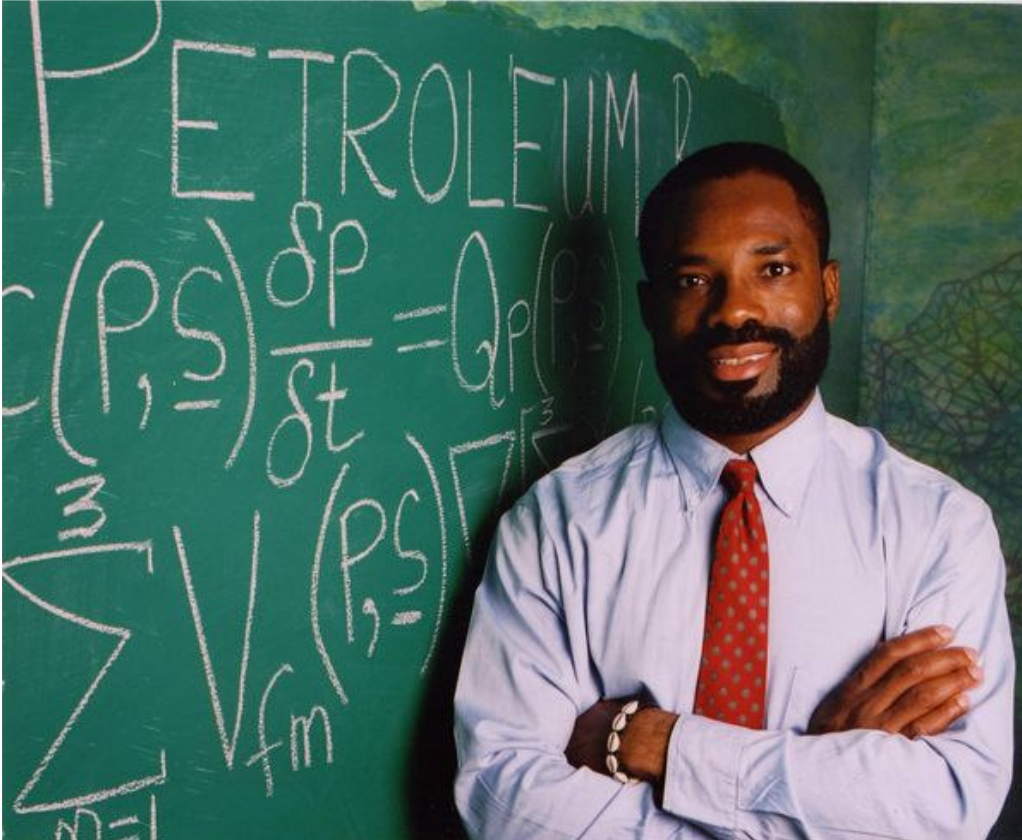
“Public intellectuals are the eyes and ears of Africa,” says Emeagwali.

Nduka Otiono:

In your lecture, you spoke about the new realities that make it difficult for children of Africans abroad like you to reconnect with their ancestral home. Do you personally have any plans to physically partake in efforts at developing your homeland?

Philip Emeagwali:

I quietly work behind the scenes to develop Africa. I contribute my time and ideas. A few years ago, I conducted an extensive, unpaid investigation on the diminishing Nigerian petroleum reserve.



"I was the first scientist to prove that supercomputers with thousands of electronic brains called processors can be used to recover oil," says Emeagwali

I emailed and warned elected officials that:

"Oil and gas are non-renewable and do not flow endlessly like the River Niger. Existing oil wells are yielding ever-declining production rates. This is a pregnant moment: Nigerian oil reserves diminish at 3 percent a year!"

The challenge is not in discovering oil but in recovering it. For every barrel of oil recovered two remain unrecoverable, because it is difficult to extract all the oil from an oil field, or rather oil sand — which is nothing but sand impregnated with oil....

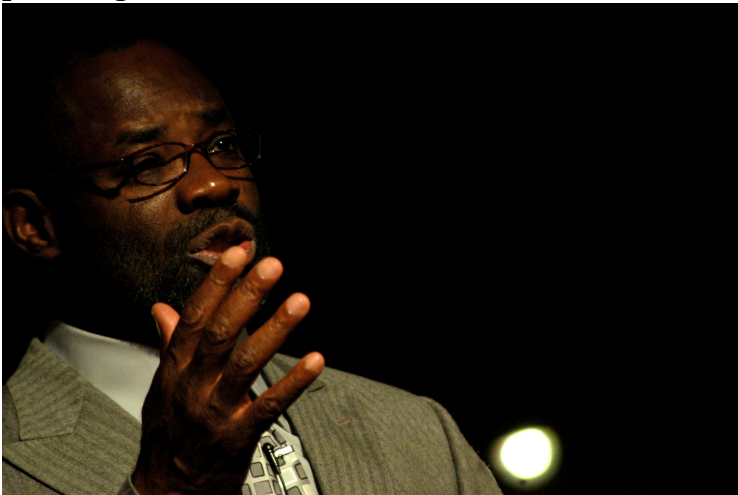
The oil we export today was formed millions of years ago — when prehistoric, dog-sized humans, which were our common ancestor with apes, walked around African grasslands on four legs. Ancient marine plants and animals that died were buried in clay before they could completely decay, and subsequent increases in temperature and pressure caused the formation of oil and gas....In practical terms, oil fields are not self-refueling. To be more precise, oil fields need a few million years to refuel.”

Nduka Otiono:

What are your plans to reconnect with Africa if any, and what is your time line?

Philip Emeagwali:

I never got paid for the work that I did. Since time immemorial, people in the creative professions were patronized. Could Beethoven, Mozart and Bach have created music without patrons that paid their living expenses? Mark Anthony benefited from the patronage of Julius Caesar; and the great mathematician Leonhard Euler relocated to St. Petersburg to earn a stipend from Queen Catherine I of Russia. Intellectual exiles will relocate to Africa when they start receiving patronage.



Nduka Otiono is an award-winning writer; an associate lecturer, English Department, University of Ibadan; a journalist and a freelance publisher; and an active member of the National Committee on UNESCO's Intangible Cultural heritage. The following opinion piece by Nduka Otiono was reproduced from *THE GUARDIAN* - March 2005: Voices of Lagos - <http://www.guardian.co.uk/pictures/image/0,8543,-10605140635,00.html>.

Lagos is made up of people stranded in the city. They work here but cannot go home. Most people live in squalor and cannot imagine any other life. They get so used to the bustle . You would think that people so exposed to such chaos would want a less urban environment, but Lagosians can't stand other places. Nightlife is a shadow of what it used to be. When it is nightfall now people hurry back home. It has led to many more neighbourhood bars, especially when there are power failures. We have what appears to be an upsurge of activities. Every weekend there are festivals but there is an absence of publishing infrastructure. I come from the generation that witnessed the complete waste of our resources like oil. Our life was marked by military dictatorship. One would have thought with the dawn of democracy there would be a revival in the arts. There is, but there is an overtone of hopelessness. There are a great number of cultural activities going on, but below the surface there is a grim feeling of where we are going. A great disappointment in the ruling class. Against this background of cultural renaissance is despair. The writing today is about survival, about lots of people not having jobs, no safety nets, about the huge investments being made in children. The most positive news from Nigeria comes from the arts, which are being recognised across the world. The most negative images come from the business and political class. The painful thing is that the political class does not read. It has a very narrow world view. Sadly, the intellectual class has simply fled. For a country that needs all of its brains, it is tragedy. The west absorbs our most distinguished intellectuals. Civil liberty

groups are growing in confidence and stature. So what keeps me? I am a writer and secretary of the Association of Nigerian authors.



Nduka Otiono

Ideas, Not Money, Alleviate Poverty

by Philip Emeagwali
philip@emeagwali.com

Comment: Delivered at the University of Alberta, Edmonton, Alberta, Canada on September 23, 2006.

I once believed that *capital* was another word for money, the accumulated wealth of a country or its people. Surely, I thought, wealth is determined by the money or property in one's possession. Then I saw a Deutsche Bank advertisement in the *Wall Street Journal* that proclaimed: "Ideas are capital. The rest is just money."

I was struck by the simplicity of such an eloquent and forceful idea. I started imagining what such power meant for Africa. The potential for progress and poverty alleviation in Africa relies on capital generated from the power within our minds, not from our ability to pick minerals from the ground or seek debt relief and foreign assistance.

If ideas are capital, why is Africa investing more on things than on information, and more on the military than on education? Suddenly, I realized what this idea could mean for Africa. If the pen is mightier than the sword, why does a general earn more than the work of a hundred writers combined? If ideas are indeed capital, then Africa should stem its brain drain and promote the African Renaissance, which will lead to the rebirth of the continent. After all, a renaissance is a rebirth of ideas. And knowledge and ideas are the engines that drive economic growth.



Philip Emeagwali speaking at the University of Alberta, Canada on September 23, 2006.

When African men and women of ideas, who will give birth to new ideas, have fled to Europe and the United States, then the so-called African Renaissance cannot occur in Africa. It can only occur in Paris, London and New York. There are more Soukous musicians in Paris, than in Kinshasha; more African professional soccer players in Europe, than in Africa. African literature is more at home abroad than it is in Africa. In other words, Africans in Europe are alleviating poverty in Europe, not in Africa. Until the men and women of ideas – the true healers of Africa – start returning home, the African Renaissance and poverty alleviation will remain empty slogans. After all, the brightest ideas are generated and harnessed by men of ideas.

The first annual report by J.P. Morgan Chase, a firm with assets of 1.3 trillion dollars, reads: “The power of intellectual capital is the ability to breed ideas that ignite value.” This quote is a clarion call to African leaders to shift purposefully and deliberately from a focus on things to a focus on information; from exporting natural resources to exporting knowledge and ideas; and from being a consumer of technology to becoming a producer of technology.

For Africa, poverty will be reduced when intellectual capital is increased and leveraged to export knowledge and ideas. Africa’s primary strategy for poverty alleviation is to gain debt relief, foreign assistance, and investments from western nations. Poverty alleviation means looking beyond 100 percent literacy and aiming for 100 percent numeracy, the prerequisite for increasing our technological intellectual capital. Yet, in this age of information and globalization when poverty alleviation should result in producing valuable products for the global market and competing with Asia, the United States, and Europe – shamefully, diamonds found in Africa are polished in Europe and re-sold to Africans.

The intellectual capital needed to produce products and services will lead to the path of poverty alleviation. Intellectual capital, defined as the collective knowledge of the people, increases productivity. The latter – by driving economic growth – alleviates poverty, always and everywhere, even in Africa. Productivity is the engine that drives global economic growth.

Those who create new knowledge are producing wealth, while those who consume it are producing poverty. If you attend a Wole Soyinka’s production of Chinua Achebe’s “Things Fall Apart,” you consume the knowledge produced by Soyinka and Achebe as well as the actor’s production, much like I consume the knowledge and production of Bob Marley’s through his songs.

We will need wisdom, that which turns too much information – or information overload – into focused power, not only to process, but also to evaluate the overwhelming amount of information available on the Internet. This wisdom will give us the competitive edge and enable us to find creative solutions.

The following story illustrates the difference between information and wisdom. Twelve hundred years ago, in the city of Baghdad, lived a genius named Al-Khwarizmi, who was one of the fathers of algebra. In fact, the word *algebra* comes from the title of his book *Al-jabr*, which for centuries was the standard mathematics textbook. Al-Khwarizmi taught in an institution of learning called the *House of Wisdom*, which was the center of new ideas during Islam's golden age of science. To this day we computer scientists honor Al-Khwarizmi when we use the word *algorithm*, which is our attempt to pronounce his name.

One day, Al-Khwarizmi was riding a camel laden down with algebraic manuscripts to the holy city of Mecca. He saw three young men crying at an oasis.

"My children, why are you crying?" he enquired.

"Our father, upon his death, instructed us to divide his 17 camels as follows:

'To my oldest son I leave half of my camels, my second son shall have one-third of my camels, and my youngest son is to have one-ninth of my camels.'

"What, then, is your problem?" Al-Khwarizmi asked.

"We have been to school and learned that 17 is a prime number that is, divisible only by one and itself and cannot be divided by two or three or nine. Since we love our camels, we cannot divide them exactly," they answered.

Al-Khwarizmi thought for a while and asked, "Will it help if I offer my camel and make the total 18?"

"No, no, no," they cried.

"You are on your way to Mecca, and you need your camel."

“Go ahead, have my camel, and divide the 18 camels amongst yourselves,” he said, smiling.

So the eldest took one-half of 18 – or nine camels. The second took one-third of 18 – or six camels. The youngest took one-ninth of 18 – or two camels. After the division, one camel was left: Al-Khwarizmi’s camel, as the total number of camels divided among the sons (nine plus six plus two) equaled 17.

Then Al-Khwarizmi asked, “Now, can I have my camel back?”

These young men had information about prime numbers, but they lacked the wisdom to use the information effectively. It is the manipulation of information to accomplish seemingly impossible purposes that defines true wisdom.

Today, we have ten billion pages of information posted on the Internet – more than enough to keep us busy the rest of our lives, and new information is being added daily. More information has been created in the last 100 years than in all of the previous 100,000 years combined. We need the wisdom to sift through and convert these billions of pages into information riches.

The genius of Al-Khwarizmi was not in his mathematical wizardry or even his book knowledge: It was in his experiential knowledge – his big-picture, right-brain thinking; creativity; innovation; and wisdom. It was his wisdom to add a camel to make the total 18 and still get his camel back.

Prime numbers are to whole numbers what the laws of physics are to physics. Twenty years ago, I used an Al-Khwarizmi approach to solve a notoriously difficult problem in physics. I added inertial force, which enabled me to reformulate Newton’s Second Law of Motion first as 18 equations and algorithms, and then as 24 million algebraic equations. Finally, I programmed 65,000 “electronic brains” called processors to work as one to solve those 24 million equations at a speed of 3.1 billion calculations per second.

Like Al-Khwarizmi, I derived my 18 equations through out-of-the-box thinking in an in-the-box world, adding my metaphorical camel: inertial force. In other words, I applied wisdom to known knowledge to generate intellectual capital.

Unless Africa significantly increases its intellectual capital, the continent will remain irrelevant in the 21st century and even beyond. Africa needs innovators, producers of knowledge, and wise men and women who can discover, propose, and then implement progressive ideas. Africa's fate lies in the hands of Africans and the solution to poverty must come from its people. The future that lies ahead of Africa is for Africa to create, after the people have outlined their vision. We owe it to our children to build a firm foundation to enable them go places we only dreamt. For Africa to take center stage in today's economic world, we have to go out and compete on a global basis. There is simply no other way to succeed.