

Frank Yost
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It is the custom of many writers on political and economic affairs in recent years to lay all the blame for the worsening conditions of Western nations on OPEC, and escalating oil prices. What blame is not attached to OPEC is attributed to Japan and its impact in international trade.

The purpose of this paper is to present a point of view on world affairs that is to me very novel - and, in fact, almost revolutionary. It is in simplest terms that the United States and Japan should pay for their OPEC oil with computer technology to be applied to Third World peoples and nations. These people would thereby be brought out of their ignorance, hunger and poverty. Immense new markets for international trade and renewed world prosperity would appear.

Last fall my attention was drawn to two books - "The Soul of a New Machine" by Tracy Kidder, and "The World Challenge" by Jean Jacques Servan - Schreiber. The first (which some of you may have read) became one of the "ten best sellers". It is one of a popular class of books about how to succeed, or motivate people to succeed in some enterprise. It deals with the building of a new computer.

The second book presents computers as "the new oil" for the world. Its author is French and the book an English translation. He is known as JJSS.

Most of us here remember the time when an adding machine was a very bulky clumsy device, and a calculator that could multiply or divide went through a prolonged cycle of whirring sound before presenting its answer. Bookkeeping machines, which could only

add and subtract, and print numbers in debit or credit columns were even more clumsy. They were digital machines, contrived with wheels and gears to count numbers.

The first true numbers instrument was contrived by Pythagoras in the 6th. century B.C. - this being the multiplication tables. Long before this the abacas had been used for treating with numbers. Pascal in the mid-17th. century built a mechanical adding machine. Pascal and his teachings wereremembered, but his adding machine was soon forgotten by everyone. That is, except a genuis named Gottfried Wilhelm von Leibniz, who asserted that knowledge could not be accumulated and controlled and used in man's service until we learned to mechanize and automate the treatment of numbers. He set about improving Pascal's machine to do this - and is given credit for the binary system of calculation - now the heart of all our electronic devices.

It took many centuries to advance from the abacas to a mechanical adding machine, but only a few decades to achieve an electronic calculator the size and thickness of a credit card, capable of performing more functions than a typewriter size machine of 20 years ago.

After World War II, our primary enemies became the two most prosperous nations outside the USA - all because of us.

Servan-Schreiber says it was the destruction of Hiroshima and Nagasaki on August 7 and August 9 of 1945 that set Japan on the course to its present outstanding achievements in ways well known to us today. In that late summer of 1945, Japan was completely devastated, two million of its people dead from the war - a

third of them civilians; almost half of its city areas destroyed, those people who survived were confused, disillusioned - their vision-their Emperor-God had failed! The two bombings bringing such horrible, instant destruction left them with no material resources. So they turned to the asset which remained - human intelligence.

Our nation - we - helped Japan, and with our "Marshall Plan" helped Germany and other European nations to restore their cities, highways, railroads, agriculture, industry. It led to an unprecedented period of prosperity for this country and for them. For everyone, that is, except the Third World nations including those now rich from oil.

The idea that computers could be the means of bringing prosperity to the poor, largely illiterate people of the Third World countries seems preposterous. Most of us remember the first presidential election year (was it 1948 or 1952?) when a computer called Univac was arranged to project, to forecast final election results on just a small fraction of returns. This was an incredible marvel at that time. The instrument itself required a room half the size of a tennis court - with another equal space to contain air conditioners to cool the computer and keep it functioning.

Students at the University of Illinois had built such a machine called "Illiac". I visited this in the early '60's. Then, as now, the time of a computer was so precious and sought after that researchers attended it night and day. A bit later, I visited a similar machine at a bank in Nashville. These have long since been outdated. Today a computer in a cabinet no

larger than a home refrigerator would do the same work, in fact the work of several Univacs.

The ability of computers to perform, to solve problems, to handle information has been increased in exponential power. To illustrate this Servan-Schreiber says to imagine taking a sheet of good quality book paper and folding it on itself 50 times. How thick would it be? At first it would seem perhaps a few feet - but since we know doubling brings rapid growth, we would say several hundred feet. Actually, such an imaginary sheet of paper, doubled 50 times, would reach into outer space!

I have two sons-in-law whose lives are very closely related to computers. One has for some years been a member of a small team at MIT working on "artificial intelligence"-machines which among other things than being able to see and count - will accept spoken instructions and answer orally, making what seem to be intelligent decisions.

You may have heard recently of the brothers (somewhere in the mid-west, I think) who built a robot in a wheel chair to baby sit with the young children of one of the men. It could guard against intruders, or fires, play games and tell stories when requested. I believe it would get food from the refrigerator but could not make a cake or change diapers. The MIT group has a robot named "Shakey" who will move from room to room, fetch certain items and perform manipulative tasks with his "hands". These machines are used to build automobiles - and there are more of them in Japan than anywhere else in the world.

The fascinating story in "The Soul of a New Machine" is

about a group of electronic engineers in the employ of Data General Corporation at Westborough, Mass., just west of Boston and near I-95 and 495. Data General had been incorporated in 1968 by two young engineer-executives of another young, very successful computer company. Within ten years, Data General had grown so rapidly that it was listed in the "Fortune 500". Data General and DEC (Digital Equipment Corp.), from which it sprang as a rival, were producers of mini-computers, while IBM, the dominant leader in the computer field, was the producer of mainframe equipment. The people at IBM have always been known for their white shirt, blue suit appearance. The others, particularly Data General, took on the informal look of the time - worn jeans, soft shoes, open shirts and hair all over the head and face.

In 1968, Data General became very concerned over a new mini-computer being offered for sale by its rival, DEC. It was called VAX and sold for about \$100,000, and said to outperform anything previously available. It was described as a "breakthrough". The man who was a guiding genius of Data General's young engineers found through a friend where a new VAX was being installed. The machines had been shown at a gala opening - and there was much printed material telling about VAX. But West, the Data General expert, wanted a closer look. So he visited the site of the installation, "somewhere in the USA". His casual dress did not attract attention - so he walked into the place as if he belonged there. His presence was not illegal - but it might be called sly. **The** VAX was in a room without windows, a trough had been cut in the floor to accommodate the many cables and conduits to give

input and output to the machine. Someone, obviously an installation engineer, was before the open cabinet of the machine. He asked no questions - so West watched quietly as the man worked and until a few minutes later he closed his tool box and left the room.

Then West closed the door to the room, went to the VAX and began to pull out and examine the panels, which make up a computer, and the intricate parts on each panel. He counted and identified many of the parts and then could estimate the cost. But, he studied carefully the way it was put together and connected. To West, it was like a corporate organization chart of its builder, DEC, in that it expressed their cautious, bureaucratic style. For his taste, there was too much protocol. The VAX seemed designed to cut down the risk. West said he wanted his team to "maximize the win", by building a machine that would go unbelievably fast.

West and his group did not copy the VAX, but they were reassured of the rightness of their planned approach - as outlined for them by the head of their company. West recruited his team from within and outside Data General - many fresh out of college, all very sure of their ability to do the impossible, and build a computer that no single person could have built, and, in fact, could not completely comprehend. Each one in turn was so indoctrinated and dedicated to this project, called "Eagle", that it became a dominant obsession. They were often working 12 hour days - sometimes 24 at a stretch - and were divided into groups so that work went on night and day.

It was hoped to complete the project in a year but actually took a few months longer. The top management had to be kept informed - and persuaded to approve it for manufacture and marketing. There was a similar rival project in another division of Data General. The whole thing was very tense, exciting and a challenge to the skills and ingenuity of this group.

Data General desperately needed a computer to compete with the VAX of DEC. This project succeeded in doing more than that. It produced a new generation of super-mini computers. The men (and one woman) who did this were so immersed in the excitement of it that they became ideal dedicated employees, whose sole object in life was to find the solution. However, one man did sort of burn out on the project and quit. Kidder reported it this way. The group had built - and was debugging the machine - which was timing its own functions at 200 billionths of a second. The engineer in question visited a New England commune for a week-end. A young woman walked by in the sun, bare to the waist. She was, he said, "a miracle of biological engineering". He immediately sent word to his Eagle project co-workers that he was going to join a commune and think in terms of no unit of time shorter than a season.

Computer designers talk of artificial intelligence - and it is no wonder. For, a computer functions exactly like a human brain with the same kinds of intricate circuits, and can make careful minute comparisons of objects and ideas and present a solution or a number of possible solutions.

It is this miraculous technology and the things it can do that have induced a conference of OPEC leaders to issue a Taif

report "conceived as a challenge, a warning, and finally a demand for a massive transfer of technology from the United States, Europe and Japan to the poor and needy. It is not just another wishful plea, for it is backed up by the most powerful of all new weapons: oil."

Some contemporary economists of considerable stature have told us that our only way to change the world from its present sorry economic plight is to stoically endure a 10 to 12 year period of austerity and plain living. During this time money could be saved and invested in new modern equipment and gradually lead to increased productivity and prosperity.

Servan-Schreiber says this is too long to wait. That some peoples of the world have already waited for generations and are losing patience.

We live today in what is mostly a closed or inelastic economy. That is certainly true in the food business. If a person is well nourished he can't or should not eat more food. If I sell him more of SUNFLOUR and SUNFLOWER MEAL, he has to eat less of Gold Metal, or Lexington Cream, or Martha White. The same is true of clothes, appliances, furniture, autos, homes. A fixed number of units of a product represents the "market". We fight over our share. We are "at war" with our competitors. The same is true in world markets. When Japan ships thousands, or millions of cars beyond its borders, the USA or some European car maker loses that much business.

When South Africa has a big corn crop, it may supply most of the world import needs, and our corn goes begging. When the

Soviets have a big crop, our surpluses pile up. If they have a failure as in 1973, they buy heavily and the market excitement of 1973 is repeated.

The population of Third World countries is at least 3 billion. In India, for example, the annual per capita income in a recent year was just \$200. In the same year in the USA, it was \$10,000. Here is a market beyond our wildest dream. JJSS says that we can help them develop with computer technology - and this whole process of development will bring a new age of world prosperity.

Many - perhaps most people of Third World nations live in arid or semi-arid lands. Israeli is a good example of the scientific planned use of a very limited supply of water to produce a maximum quantity of food from land that for years produced nothing. It seems there are many desirable crops that can even be grown with salt water.

It can be noted that great benefits often come from destruction or calamities. Phoenix, a fabulous bird of Egyptian legend, arose from its own ashes. So throughout recorded history and from archeological evidence of pre-recorded times - have new cities arisen from the "ashes" or rubble of older ones. General Robert E. Lee is said to have been loath to visit Chancellorsville after the war - not wishing to see again the horrors of the war's destruction. When he did visit it he found a busy thriving place, with few scars of the war in evidence. So it was with Atlanta - so it has been in recent years with bombed out cities and factories of Europe and Japan. Except for lost treasures of art or architecture the new is better and more efficient than the old.

It took the tragedy and calamity of World War II to change this country from depression to the road to prosperity. Our Marshall Plan and other Foreign Assistance Programs brought prosperity to our Allies, our enemies and to us after the war. Will we dare to try, or is it really possible, as Servan-Schreiber says to have the USA and Japan use their marvelous computers and technical skills to start the 3 billion people of the Third World on the way to prosperity, and ourselves on the same happy course?

Servan-Schreiber has presented the world economic situation in this way. The Third World is going bankrupt very fast. It is not able to create wealth. It has tremendous debts. It is asking for the capacity to create wealth for its 3 billion people. At the same time, a crisis has appeared in countries of the developed world - North America, Europe and Japan, where there is continued and growing unemployment and inflation and where outdated industry faces bankruptcy. The problem is whether both worlds - the Third World, and the "developed world" - can escape from their dilemma - and move into a new cycle of development.

They - the "Third World" - are not asking for a division of existing wealth, not to take away from our Western living standard to give to them, but that together we plan and arrange the means for everyone to create new wealth and thus have a new world.

The OPEC countries have a tremendous resource in their oil. However, it is expected to be exhausted in another 20 years,

almost by the year 2000. That is a short enough time to represent a crisis to them. They must have an investment outlet for their oil money that will bring a good return when the oil is gone. And, that is where the computer and information technology comes in. It represents the industry of the future.

JJSS has said that three of the most important and necessary factors for the wellbeing of any nation or people are knowledge, health and agronomy. We know that knowledge will lead to improved health and agronomy. And, we feel that computers are today's and tomorrow's key to knowledge.

But, how can computers benefit people who are too backward and ignorant to use them. How can you take an illiterate population and use the computer to transfer knowledge to them. The answer is not given, but the problem is posed for the scientists and psychologists of today.

TIME Magazine has said that it defies common sense to think that the agonizing poverty and rampant illiteracy and ideological divisions in Third World Nations will disappear almost immediately through use of computer information technology. And, FORBES has said "It is a complex tangle of politics, philosophy, religion, armies, technology, and social discipline that explains regional income difference, not simply machines and educational programs".

To these comments Servan-Schreiber has replied that the cited objections cannot be used as excuses "for not starting to distribute knowledge in a world wide way". He says we do not dare not commit ourselves to making it a successful world project.

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