

# A Plenipotentiary for Human Intelligence

*Venezuela mounts an ambitious program for development of intelligence as Minister Machado gains an international hearing for the cause*

Venezuela is a member of OPEC and the only big league oil-producing country in South America. It is also the only country on the continent, or anywhere else for that matter, with a Minister of State for the Development of Intelligence.

"We think that our [true] riches are not in oil but in brains," says the minister with the unique title, Luis Alberto Machado. He also believes that human intelligence can be developed, and that belief is the basis of an ambitious national program which he has single-mindedly championed. The program won the support of Venezuelan president Luis Herrera Campins and survived initial skepticism and more than a little ridicule when it was initiated 2 years ago.

The program is a comprehensive one, operating through maternity hospitals, the mass media, schools and universities, the armed forces, and the civil service. Machado is a minister without portfolio, which means he does not administer a government department nor command a large budget. The backing of President Herrera, however, has guaranteed help from Venezuela's health and education ministries and cooperation from the nation's television services.

Machado, a well-traveled missionary for his ideas, was in Washington recently. He prefers to talk in broad concepts and is not easy to deflect into a discussion of detail. In fact, the Venezuelan program is not based on the theories of any particular school or individual. The approach is highly eclectic, using multiple methodologies, although Machado claims for it an ample scientific basis.

It is worth noting that Machado and his associates have avoided the controversy that surrounds almost any discussion of intelligence in the United States. They have managed this by deemphasizing the issue of the heritability of intelligence, which in this country has raised questions about standardized IQ testing and triggered acrimonious disputes about racial differences in intelligence.

Machado espouses the view that the intellectual capacities of normal human beings are so incompletely developed that the sensible course is to "help all people fulfill their potential." He does not deny differences in genetic endowment among individuals, but believes

that environmental factors are far more important. "All children are gifted children," he says, and "it is necessary to develop the genetic capacity of all of them."

His other major guiding principle is that opportunities to develop intelligence "must be open to all, not to a minority. I think that if we allow development only for a minority we give power to that minority."

Underlying his argument is the thesis he expressed this way at the colloquium in Madrid in 1979. "It is clear for present-day science that the human brain of today is in essence the same as man at the dawn of history. In substance, the brain has not varied. What has varied then? Education. The learning which is passed on from one generation to another." In an interview, Machado elaborated. "The difference is the information going into the brain and the processing it receives. Our duty is to accelerate the process. It is a fundamental human right to develop that capacity." To accomplish this aim he says that education at all levels must raise human capacities. "We must give facilities to all from birth to old age."

Venezuela's intelligence-enhancing program begins with emphasis on good

In primary school, children beginning in the fourth grade will take "Learning to Think" classes on a model created by Edward de Bono, director of the Center for the Study of Thinking Skills in Cambridge, England. De Bono's work stresses creativity. Those familiar with it say pupils are encouraged to focus on everyday problems and to consider multiple aspects of an issue before settling on a solution. What is called "lateral thinking" is emphasized and class discussion resembles what is known as brainstorming in this country. Machado says that Ministry of Education officials, who were skeptical at the outset, have observed the new classes and are highly impressed. The plan is to extend the classes through the fifth and sixth grades.

Still in the early stages is "Project Intelligence," a course for seventh graders produced by a collaboration between researchers at Harvard and the staff of the Cambridge consulting firm of Bolt, Beranek and Newman. The idea for the course emerged from conversations between Machado and Harvard psychology professor Richard Herrnstein.

Consulting what Allan Collins of BBN calls "the collective wisdom" of research in cognitive psychology, those

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prenatal care and infant nutrition. To provide "motivation" for babies, doctors, nurses, and volunteers in maternity hospitals are trained to advise new parents on sensory stimulation of the newborns and other basics. Instructions recorded on video cassettes are also played to new mothers over television sets in maternity hospital rooms.

Machado says that since the first 6 years of life are more important for development than the rest of life the family is a main focus of the program. The national media have been enlisted in the cause, particularly television on which, for example, series of TV spots similar to commercials will be run and rerun.

working on the project developed material "based on process analyses of skilled performance in various academic tasks." These techniques were then embedded in lessons on such things as quantitative skills, basic logic, language, design, and problem-solving.

A series of teachers' handbooks in English was produced and lessons tried out in Cambridge schools. The handbooks were then translated into Spanish and the first pilot classes are being conducted this fall in a barrio school in Barquisemeto, a city of about a half million, a 3- or 4-hour drive from Caracas. The approach utilized in Project Intelligence classes is regarded as complemen-

tary to de Bono's Learning to Think course, but is intended to be more directly helpful to pupils in dealing with the regular curriculum. Evaluation of the new course presents some unusual problems. Not only are there few testing instruments in Spanish, but the need to measure more than simply academic progress is obliging the project staff to devise its own before and after tests. The pilot program is scheduled to expand to four to six schools in January. Project Intelligence is funded at about \$2 million.

Other projects include one in which children are taught to play chess and the effect on intellectual performance is observed. Another is designed to help students achieve rapid proficiency in playing musical instruments. The Learning to Think course has been adapted for use in the armed forces and this year a version of the course was tried with first-year engineering students in Caracas. The effort was received with some hauteur at first by students and faculty, but Machado says that later reactions have been favorable.

The task of training teachers for the new programs generally follows that used for the Learning to Think course. Machado says that five outstanding psychologists and pedagogical experts instructed 150 selected teachers who in turn transmitted the training to 42,000 teachers who have 1.2 million students in their classes.

How has Machado managed to ignite a program that B. F. Skinner said "will no doubt take its place as one of the great social experiments of this century"? Machado does not present himself as an educational or social reformer but insists on calling himself a politician. He represents a recognizable type of Latin American intellectual. Trained as a lawyer in Madrid during the 1950's with studies in social sciences thrown in, he has made a career in politics and government and demonstrated literary inclinations. What sets him apart is his long-standing interest in the subject of intelligence and his zeal in following through on it.

He has been identified with Venezuela's Christian Democratic Party during the period of government by democratic succession that began with the presidency of Romulo Betancourt in the 1950's and remains a rarity in a region dominated by colonels and coups.

Machado served as chief of the presidential staff during the term of President Rafael Caldera between 1969 and 1974. When his party was defeated, Machado did some traveling and thinking and in 1975 published his book *The Revolution of the Intelligence*, which he says "start-

ed a polemic." He followed up with *The Right to be Intelligent* in 1978 and when Herrera was elected president the new ministry was created and Machado appointed in early 1979.

At the beginning there was "great skepticism," says Machado. An average of seven articles a day appeared in the press on the subject, many of them highly satirical in tone. "Because of the title people laughed," says Machado, but Herrera stood fast and said, "We have to go ahead." The "most important skep-



**Luis Alberto Machado**

tics were teachers and psychologists," says Machado, but they are "now the biggest supporters."

The political purpose in the national program is obviously strong. A major aim, says Machado, is "to enable each citizen to participate fully in political life." To use a more grandiloquent phrase of his, the purpose is to "institutionalize a democracy of participation."

In the development of intelligence he sees a "deep revolution, a quiet revolution," and the effort as especially important for Venezuela and other developing countries. To make his point, Machado observes that the mathematics taught in the United States and the Soviet Union is the same as that taught in Bogotá and Caracas and the students are of equal ability, but the Nobel prizes go to the Americans and Russians. What is needed is that "our students learn to think in a critical, dialectical and systematic way." The results of this will be "better science and technology and because of this we will have more food and goods to distribute."

Asked to name those who have particularly influenced him, Machado cited behaviorist Skinner, inventor-prophet Buckminster Fuller, and de Bono, cer-

tainly a well-assorted trio. By and large, the Venezuelan program has drawn on the work of those identified with the burgeoning field of cognitive psychology. These scholars generally laud Machado for his faith and works.

Many psychologists find it difficult, however, to accept outright Machado's central premise that intelligence can be developed. In a statement in the March-April issue of *Human Intelligence* newsletter, for example, John Lochhead said, "The idea that intelligence can be developed is, of course, still quite controversial. Since we are not sure of what it really is, we can't be too certain about our ability to change it. . . ."

Asked by *Science* for a general estimate of the Venezuelan program, Lochhead, of the Cognitive Development Project at the University of Massachusetts in Amherst, gave what seemed to be a representative evaluation. "Any undertaking like this is a high-risk venture," he said. Inevitably, it will be a trial and error process. They'll try a lot of things and see which are valid." Lochhead says he is "impressed by the scale of the effort" and is "excited about the possibilities."

Outside Venezuela, Machado has been remarkably successful in creating an international array of admirers, advisers, and allies. He has been listened to and lionized at the international scholarly meetings, won the attention of UNESCO and the International Labor Organization, and has been honored by the establishment of the Luis Alberto Machado Chair for Research into Human Modifiability and the Development of Intelligence at Bar-Ilan University in Israel. The September-October issue of *Interciencia* is a special issue devoted to the development of intelligence and carries an interview with Machado.

Education and the creation of "human capital" have had an important place in postwar strategies for economic development and social transformation. But enthusiasm and initiative for ideas such as those embodied in the Venezuelan program seem to be coming increasingly from the LDC's.

Machado himself has a grand design for a World Alliance for Intelligence among Third World nations. So far, he has failed to gain the sponsorship of the United States or other industrial nations. But signs of interest are growing as, for example, in UNESCO's reported intention to strengthen a program on cognitive development and the learning process. In January, a Conference on Thinking is scheduled for Fiji, evidence at least of the reach of the ideas.—JOHN WALSH