

NEUROLOGY

New World Institute

Venezuela's Institute for Neurology and Brain Research is attracting the world's scientists. When completed, the center will be headquarters for studying man's brain.

See Front Cover

By HOWARD SIMONS

► THERE IS A QUIET revolution taking place in the high jungle 12 miles south of Venezuela's capital city of Caracas, where a small band of dedicated men are challenging a long-standing authority. Unlike the South American revolutions that receive wide publicity in the North American press, this unheralded rebellion is not founded on political, social or economic discontent. It is, rather, a fight between man and his environment and its eventual outcome could very well shake all of South America and all of mankind.

The headquarters for this battle is a small pilot research center called the Venezuelan Institute for Neurology and Brain Research. Tucked away on a mountain top, from whose height one can pick out landmarks in Caracas itself, IVNIC, as it is called, is currently the command post of a small group of scientists involved in deadly combat with the real jungle that surrounds them and the mental jungle that ensnarls them.

Determined to harness the minds of men now lying dormant under the oppression of the tropical climate that turns fertile minds lethargic, IVNIC's army has already contributed to the world's scientific body of knowledge. The plant itself is but a forerunner of a multimillion dollar program designed to create one of the world's leading scientific centers for medical research.

With the blessings and wealth of the Venezuelan Government and the drive of a single young and brilliant Venezuelan scientist, Dr. Humberto Fernandez-Moran, the embryonic research center has become a reality. Although its future promises staggering contributions to the world's body of scientific knowledge, its presence is already being felt.

Establishing the Center

Germinated in 1944 by Dr. Fernandez-Moran, the dream for the center was only a dream until 1954, when the young Venezuelan found a sympathetic ear of the one man in all Venezuela who could both help him, and was equally as imaginative and science-minded, President Marcos Perez Jimenez, a one-time mathematician and science teacher.

A million dollars was granted for the project and the center was made an autonomous Government agency like our own National Institutes of Health. With the green light granted, Dr. Fernandez-Moran

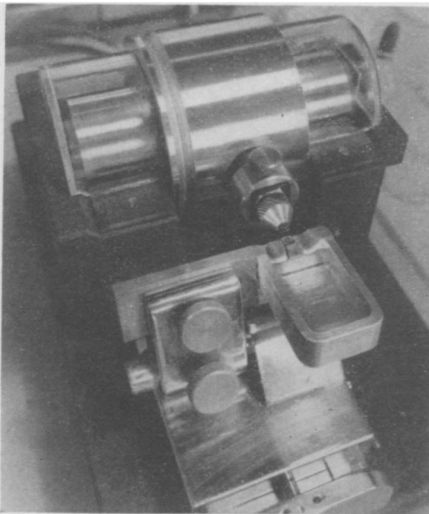
wasted no more time. Aided by the Venezuelan Air Force, he scoured the countryside for an ideal location. And he found it atop a mountain in high jungle, within sight of the capital city.

Out of virgin territory, the center was born in record time. Even today construction progresses along with research. Men are literally moving aside mountains to house a unique atomic reactor, while only a few miles away other men are moving aside a microscopic world heretofore unknown to man.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the pilot plant of the Institute, nestled in high jungle.

Even before the first building was completed, the Center was being staffed with outstanding young scientists from Europe. Today, for example, one has to be multilingual to communicate at the Center, where the scientists speak Swedish, German, French, Spanish and English. Again before the first building was completed, research began and in the first year, 15 scientific papers were published by staff members.

Some of the research resulted in original contributions, such as the discovery of sensory or light receptor elements and fine structure in the eye of the insect, a study of the fine structure of bone and the application of nuclear magnetic resonance techniques to study nerve tissue.



DIAMOND KNIFE—*This is the Ultramicrotome and the diamond knife being used at IVNIC for making serial sections from 50 to 100 angstrom units thick. The knife can slice cleanly through tissue, bone, metal, and crystals.*

Not all the work was in basic science, however.

In February through April of 1955, IVNIC scientists made the first serological study of Salk polio vaccine with 2,000 Venezuelan children. The study resulted in valuable information on the antibodies in the blood to the three polio virus types found in youngsters of the tropics under five years of age.

Much of this early work was made possible by use of an invention of Dr. Fernandez-Moran and a universal trade mark of the new research center—the diamond knife.

The Diamond Knife

The diamond knife has now made it possible for scientists the world over to slice life into its thinnest part—50 to 100 angstrom units thick. (One angstrom unit is one ten-millionth of a millimeter. The word angstrom printed by an elite typewriter would contain 200,000,000 angstrom units.)

Production of the diamond knives, which can slice cleanly through uranium, involves a long and carefully controlled process which starts with the embedding of industrial diamonds in special alloys. The diamonds are then rough ground. Finally, they are ground a second time to their particular fine cutting edge by using ultracentrifuged diamond powders. The diamond knives made at IVNIC are often placed in special containers and sent as gifts of the Institute to other centers of scientific research throughout the world.

One unique experiment now being carried on with the aid of the diamond knife at IVNIC is a direct result of cooperation between the Institute, SCIENCE SERVICE and the Smithsonian Institution of Washington, D. C.

Scientists at the Institute have been studying the microstructure of the insect eye. To make slices that can be read with an electron microscope, the insect eye is embedded in plastic. Fossil insects embedded in gum copal millions of years ago are almost identical with their modern-day counterparts.

An embedded fossil insect was sent to the Institute from the Smithsonian's extensive collection. Researchers at IVNIC are now slicing the fossil insect apart to attempt to determine what, if any, evolutionary changes there have been in the structure of insects over millions of years.

Institute's Basic Aims

Research similar to that now taking place at the Venezuelan Institute is also taking place at other, older, world centers of scientific study. But the basic aims of IVNIC and its location make it unique.

The Institute has two basic aims:

One is for IVNIC to act as a local South American phenomenon which will excite

and recruit the wealth of scientific talent now lying dormant throughout tropical America.

It is believed that if IVNIC proves successful, it will be the trigger mechanism for similar scientific enterprises in South America and will illustrate to the world that significant research can be done in South America.

The second basic aim is to concentrate on the brain, which the Center's scientists believe is the lock to mankind's development, with knowledge of the brain the key to open the lock.

As stated by Dr. Fernandez-Moran, "the best approach to the brain and the central nervous system is through the study of the ultrastructure of nerve tissue in its broadest sense.

"In the highly ordered 'paracrystalline' structure of the nerve, it is conceivable that many properties of crystals like piezoelectricity and above all, semi-conductor properties can also be found in the nervous system components. This might then furnish the long sought after equivalent elements between real and electronic brains."

Dr. Fernandez-Moran also explains that the Institute is an "ideal viewing station for the study of the fantastic variety of life forms in the tropics—where Nature's hand slipped."

To accomplish these aims, the Venezuelans are going all out. A total of \$5,000,000 has been spent to date, and it is estimated that the entire project will cost upwards of \$50,000,000 when it has been completed.

At present, there are equipped laboratories for research into nerve ultrastructure, neurophysiology, biophysics, biochemistry and biomathematics; a library; a power station; workshops; and residential units for the Institute's staff.

To be built are a large building for the neurotropic virus research unit, a radiation laboratory, biochemistry, biomathematics and experimental neuropharmacology buildings and a 200-bed research hospital.

The radiation laboratory will be housed in the side of a mountain, alongside the "world's safest atomic reactor." The reactor, designed by Dr. Walter H. Zinn of the General Nuclear Engineering Company, is to be built by the General Electric Company.

A Dream Come True

The Institute, which has already attracted some of the world's foremost scientists, is thought of in Venezuela as fulfillment of a prophecy made by Simon Bolivar in 1819. The great liberator said, "I seem to see my country at the very heart of the universe . . . I behold her shipping to all corners of the earth the treasures . . . which lie hidden in her mountains. I can see her dispensing . . . health and life to the ailing . . . I can see her confiding her precious secrets to the learned men who do not know that her store of knowledge is superior to the wealth with which Nature has prodigally endowed her."

Science News Letter, August 17, 1957

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