

TRANSCENDENCE OF VITAL BRAZIL'S WORK

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This First International Symposium on Venomous Animals justly takes place in São Paulo, as it is organized in honour of the outstanding work and illustrious personality of Vital Brazil, founder of the Instituto Butantan, which has been and still is an example in its field in the world. It was the first in South America to introduce the specific treatment and prophylaxis of accidents in man and domestic animals by snake, scorpion and spider venom. His life should be an example for the future generations and his work rendered it a glory to Brazil and South America.

The great human achievements are obtained by scientific studies and their application. There is no pure and applied science, but only science and application of sciences. The basic investigation is the fountain of all progress of the applied science and of the technology which unrelentlessly transforms the world. In the past century a movement of nationalist affirmation and of faith in its destiny was observed in Brazil. Numerous Brazilians changed their family names to names of regions and rivers, such as Americano, Brazil, Amazonas and Tocantins, etc., or else to those of ancient tribal chiefs, such as Tibiriçá, Juracy, Tamandaré, etc. Therefore, Mr. Santos Pereira gave his firstborn the name of Vital Brazil Mineiro da Campanha. Vital, for his strength of life, Brazil, for his country, Mineiro because he came of the State of Minas Gerais, Campanha because this was the city where he was born. His life honoured these names, due to his own enduring and intelligent endeavour.

Born on April 28, 1865 and deceased on May 8, 1950, with 85 years of age. This way, in such a large life span, he could look back on the success of the work he began.

He studied humanities in São Paulo (1880 to 1885), then enrolled in medicine in Rio de Janeiro, where he studied from 1886 to 1891, working to pay for his studies; by contest he won the job of technician of physiology and presented a final theses on "Physiology of the spleen".

Back in São Paulo, he held the job of physician of the police force, sanitary inspector (1892 to 1895), worked in epidemics of cholera, yellow fever, cow-pox, typhoid fever and diphtheria. He also worked successfully as a general practitioner during the years (1895-1896) in Botucatu and was well aware of the medical and sanitary problems of his country.

Those were times of great medical progress and useful application of bacteriology and serumtherapy. This promising field awoke the enthusiasm of the young serious and hard working physicians, wherefore Vital Brazil, in 1897, enrolled as a technician in the Instituto Bacteriológico de São Paulo, under the

direction of Adolfo Lutz, one of the most eminent scientists Brazil ever had. There Vital Brazil made his first attempts at the immunization against snake venoms. In 1889 an epidemic of bubonic plague erupted in São Paulo. Vital Brazil was sent to study it and prepare an anti-plague serum in an improvised laboratory in Butantan. He fell gravely ill with plague, but fortunately recovered to take charge of his job.

With him in this epidemic worked also Oswaldo Cruz, and it is interesting to point out that from there on Vital Brazil founded Butantan and Oswaldo Cruz founded Manguinhos.

In 1901, on advice of Adolfo Lutz, the Institute of Serumtherapy of the State of São Paulo was created in Butantan, under the direction of Vital Brazil, who directed it from 1901 to 1909, and later from 1924 to 1927.

Called by the government of the State of Rio de Janeiro, he founded in 1919, in Niterói, the Institute of Hygiene, Serumtherapy and Veterinary, which bears his name and where his sons worked with him.

Under his direction were undertaken the prophylaxis and treatment of plague, typhoid fever, cow-pox, tetanus, diphtheria and zoonoses or diseases of domestic animals.

However, his most important work was the fight against ophidism and his studies on the snake, scorpion and spider venoms, the preparation of specific sera against the snake (1901), scorpion (1918) and spider (1925) venoms. He also studied the cutaneous batrachian venoms (1925).

The most original and successful work of Vital Brazil was the fight against ophidism and animal venoms, where he set a model treatment for all America and one of the best of the world.

Vital Brazil proved the specificity of the antivenomous sera, as he showed that the antitoxic sera prepared against the Asiatic poisons were inefficient against the poisons of the South American snakes. He obtained specific sera against the latter and showed that there are three types of clinical poisoning by the venoms of *Bothrops*, *Crotalus* and *Elaps*, the symptoms of which can be treated with specific sera. There are some common ones to the poisons of the *Bothrops* and the antipoisonous serum against one species has paraspecific effect up to a certain point on the poisons of other *Bothrops*. The serum against the venom of our South American *Crotalus* has a certain paraspecific effect against the venom of the North American *Crotalus*.

These knowledges made Butantan prepare several sera: monovalent antiothropic, polyvalent antiothropic, antiophidic for Central America, anticrotalic, antielapidic. The more commonly used sera are two: anticrotalic and antiophidic prepared against the venoms of *Bothrops* and *Crotalus durissus terrificus*.

To obtain the venom necessary to prepare these sera a great number of serpents were needed. The Institute established an exchange system, delivering one ampule of serum for each snake specimen sent by the farmers. These were given also a snare to capture the snakes and a wooden box to ship them. The railroads carry them for free. This method was also tried in Argentine, however, at present an additional amount is paid in money for each snake received.

The serumtherapy is responsible for a decrease in mortality. Of 20,000 men bitten each year, the mortality decreased from 25-30% to a mere 2%, and these due to late or insufficient treatment.

The snake pit at the Instituto Butantan, at the outside, constitutes a highly visited attraction for the tourists, that arrive by land, sea or air in São Paulo or Santos. Distinguished visitors of all classes of activities have expressed their interest and admiration for this spectacle.

The work of Vital Brazil was continued by his collaborators and followers. The zoological classification of the serpents initiated by J. F. Gomes was accomplished, principally by Afranio do Amaral. The chemical identification of the active components by Slotta, Fraenkel Conrat, Moura Gonçalves, Diniz and Klobusitzky; the physiological action was studied by Vellard, Oswaldo Vital Brazil, Rosenberg and others.

Vital Brazil and his collaborators have studied several actions of the venoms, coagulant, anticoagulant, hemolytic, agglutinant, cytologic, proteolytic, etc. The liberation of bradikinin was shown by Rocha e Silva, Beraldo and Rosenberg.

The poisons contain numerous enzymes which have been isolated and studied with interest in all parts, since they explain many of the symptoms and constitute interesting biochemical reactives. Vital Brazil diffused the prophylactic measures and studied the ophiophage serpents, such as the "muçurana", the ophiophage mammals, such as the skunk-like *Conepatus chilensis* and others, the ophiophage birds and certain spiders.

The scorpion venom was studied since 1907 by Maurano, Magalhães and Diniz. The antiscorpionic serum is being prepared in Butantan since 1916.

The action of the spider venoms were studied by Vital Brazil, Vellard and Bücherl. Since 1925 are being prepared in Butantan antilicoidic and antivenom sera against the venom of *Ctenus*, today *Phoneutria*. The action of the poison of *Latrodectus* has been studied in Argentine by Troise, Sampayo and, under the influence of Abalos, the antilatrodectic serum was prepared by Pirotsky. The venom of *Loxosceles* and its antiserum has been investigated mainly by Machiavello, Gajardo-Tobar and the staff of Butantan. The action of the cutaneous frog and other batrachian venoms has been studied by Vital Brazil, Jayme Pereira and Vellard.

Vital Brazil was a modest, persistent and endeavouring with great faith in the immunological methods, large capacity of simplifying and finding practical, endeavouring and simple solutions.

Vital Brazil undertook two travels to Europe (1904 and 1914) in order to get acquainted with progresses in his speciality. In 1915 he was invited by the Carnegie Foundation for the improvement of peace, to visit the United States. There he was summoned to treat an employee of the Bronx Zoo, who had been bitten by a *Crotalus atrox* and presented grave symptoms; Vital Brazil injected anticrotalic serum of Butantan, with which a swift recovery was secured, thus showing the paraspecific action of this serum.

He published many papers and gave numerous lectures to diffuse knowledge on serumtherapy against snake poisons and to organize collaboration by the people for the prophylaxis and to secure shipment of snakes and distribution of sera. He also published scientific papers; his book "La défense contre l'ophidisme", published in French in 1914, attained international repercussion with three editions.

Vital Brazil was distinguished with several honours. The President of his country has his name inscribed in the Book of Merits of Brazil. The Argentine Society of Biology appointed him, on November 9, 1922, a correspondent member and later an honorary member.

In 1943, I had the privilege to join in a tribute justly paid to Vital Brazil when a new building was inaugurated in the Instituto Vital Brazil, in Niterói, and I today rejoice to repeat textually:

“Vital Brazil is a glory to South America and his name should be remembered as that of Oswaldo Cruz, among those who initiated the true immunological science in Latin America”.

“My studies have allowed me to measure the great value of the extensive work of Vital Brazil on venoms. His demonstration of antitoxic specificity of the antipoisonous sera obliges to consider him, with justice, as a founder of the South American antiophidic serumtherapy, while high authorities wrongly assured the efficiency of antitoxic sera prepared against venoms in India”.

“It gives me a great satisfaction and a true honour to express in public all appreciation and respect his work and example inspire me, and cordially join the intended tribute.

Great and eminent persons are found today in the science of Brazil, however, their way was largely paved by the initial work of Oswaldo Cruz and Vital Brazil”.