Querido xará - Ganhei de presente (Décio e João Carlos) o teu grande livro O Conhecimento Científico, que li com encantamento. vi a Obra. Quando aparece? Venha conhecer o DG! Abraço. Newton 1.2.98

Homage to Professor Newton Freire-Maia

Professor Newton Freire-Maia.

The moment was luminous, almost mystic. On the beach of Flamengo, the afternoon was mild. I followed with my eyes the point of a piece of beachwood tracing grooves in the sand, like the baton of Anchieta. On the horizon stretched the Organs mountain range with the Finger of God rock. At the other end of the stick was the hand of Newton and, a bit above, his brain, emitting a message.

Thus was the baptism that launched me into population genetics and the baptizing monk, although an agnostic at the time, was Newton, our father. The message was Dahlberg's formula for the mean size of isolates, **$n = 2b(b-1)/f$**, where b is the average number of children per sibship and f is the rate of first cousin unions.

For me, that germinal episode symbolizes the birth of Brazilian human genetics that Newton inaugurated with his research on consanguinity, published in 1951 in *Ciência e Cultura* and, in 1952, in the *American Journal of Human Genetics.* I am proud of being his first disciple in population genetics, although I don't dwell on this point, lest I suffer disillusionment.

As with Mendel himself, he had precursors, but it was Newton who institutionalized the area. The main ones, both medical hematologists, were Ernani Martins da Silva, of the Instituto Oswaldo Cruz, who was studying the racial distribution of blood groups and the detection of sickle-cell anemia heterozygotes, when he died in an accident on the river Araguaia at 34 years of age, and F. Ottensooser, who published, in the *Revista*

Brasileira de Biologia (4: 531, 1944), a method to determine the degree of racial admixture based on the frequency of blood groups and who became famous, in 1953, after publishing, in *Nature* (1953), with K. Silberschmidt, the discovery of the anti-N agglutinin of *Vicia graminea.*

It was also Newton who institutionalized medical genetics in Brazil when he published, with his disciples Ademar Freire-Maia and Antonio Quelce-Salgado, in 1958, a note in *Ciência e Cultura*, which was also presented at the X International Genetics Congress, about the genetic aspects of achiropodia, followed by a paper in *Acta Genetica* (1959) about dysplasias and hypoplasias of the upper limbs. He was the founder of the first genetic counseling service in Brazil, in 1957, and the organizer of the I Brazilian Reunion of Human Genetics, in Curitiba (1958): Newton, our father.

How was the cultural embryonic development of the founder of human and medical genetics in Brazil? Newton, the boy, in his enchanting little town of Boa Esperança, Minas Gerais State, produced typewritten short stories, paying in this way his tribute to the mores of the times that specified that an intellectual, especially from Minas, must cultivate literature. Who routed him from the Brazilian Academy of Letters to the Academy of Science (of which he became an associate member in 1961 and a full member in 1971) was his grandfather, Domiciano, an amateur scientist, as much theoretical as experimental. At the age of 19, when he lived in Belo Horizonte, Newton published his first real book, *Hereditariedade e Vida*, with 114 pages, in an edition of 500 copies (financed by his father) and two booklets about complicated biological problems that heralded his fertility as a writer of numerous scientific books, 16 at my last count.

Since the beginning, Newton adopted as an intrinsic part of himself the mental attitude of a scientist, even before he had actually become one. He lived two years in Rio as a scientific bohemian, studying on his own whatever appealed to him, assisting conferences and sessions of the Academia Brasileira de Ciências and seeking out the best researchers of that epoch to discover how they were and how they thought, including some foreigners such as Julian Huxley, Auguste Lumière and Alexis Carrel with whom he exchanged letters and articles.

It was this phase that molded his destiny to be a scientist: he was doing make believe graduate studies before graduating, sans scholarship, sans exams, voluntary and free, in which he ruled his own scientific roost, never ceasing the hunt. It was by a hair's breadth that André Dreyfus didn't wreck this precious adventure. Impressed by Newton's talent, he offered him a scholarship to pursue the course of Natural History at the Universidade de São Paulo, with the condition that his grades never went below 7.0. Newton already showed maturity: he wanted to work as a researcher and not pass years assisting classes that held little interest for him. He refused the invitation.

Finding no opportunities in Rio, he reconciled himself to abandon his scientific orgy and return to the south of Minas to teach in a high school while assisting the only university course in existence there: a course in dentistry. Thus began his irregular self-training in didatics, that transformed him into a magnificent lecturer (confirming that one learns by doing) and obtained for him, after a fruitful career, the distinction of Professor Emeritus of the Universidade Federal do Paraná.

On the other hand, his self-instruction in science formed an excellent researcher, recognized with various honors: National Prize of Genetics Catherine Prodóscimo, awarded by the Brazilian Genetics Society (1968), "Comenda Pinhão de Ouro", of the City of Curitiba (1971), CNPq (National Research Council) medal (1981), Prize for Science and Technology of the State Government of Paraná (1987), Alfred Jurzikowyski Prize, of the National Academy of Medicine, for basic research relevant to medicine (1990), Honor awarded by the National Foundation of Ectodermal Dysplasias (1991), Honorary Citizenship of Curitiba (1994). After retirement, in 1978, he continued working intensely as a class 1A researcher of CNPq.

After finishing his dentistry course, Newton agreed with Dreyfus to take the college entrance exam for the Universidade de São Paulo (USP) and have a work contract stipulating "technical services" (in 1946 and 1947) which changed later to "technical and didactic services": thus, with only two years attendance in the course of general biology, he was already teaching in the regular course without either a teaching or bachelor degree. Finally, he was a researcher and teacher, as he has always craved for!

In 1951, after working five years at USP, he accepted the commission to organize a center of genetics studies at the Universidade Federal do Paraná (UFPR). Directing it and working hard in research has been his main task for the last 34 years. He earned his PhD (1960) with a thesis on consanguinity at the Universidade do Brasil (which today is the Universidade Federal do Rio de Janeiro) and at the UFPR became a full professor (1969), Head of the Genetics Department (until 1973), Coordinator of the Graduate Course in Human Genetics since its installation in 1978 and Director of the internationally recognized Center of Ectodermic Dysplasias Studies.

In 1956, Freire-Maia spent a year in the United States basking in the atmosphere of the laboratory of James V. Neel, in Ann Arbor, Michigan, as a Rockfeller Foundation fellow, having at this time eleven papers published, five about *Drosophila*. He published in the *American Journal of Human Genetics* his first paper on consanguinity, a subject which generated close to seventy of his papers, in which he studied its geographic distribution in Brazil and other countries, its evolution in time and its relationship to mutational load, lethal equivalents, pre-natal mortality and post-natal damage, effect of ionizing radiations, racial and social variation, migrations and isolates. On the other hand, his work on achiropodia opened a series of studies on bone anomalies, about which 13 articles were published.

Furthermore, in attending consultants, he encountered syndromes that needed to be observed, described, searched for in the bibliography and published. In this way his medical sense and ability were developed through the study of diverse types of hereditary anomalies, and for that matter, non-hereditary ones, since the geneticist, paradoxically, is always searching for the environmental influences in obscure nosologies. Because of this, Newton published, between 1970 and 1984, the description of 20 afflictions until then unknown. The last catalogue of MacKusick cites him 19 times. Besides this, numerous works of his are published to clarify syndromes incompletely described. In the group of ectodermic dysplasias, his contributions, in collaboration with Marta Pinheiro, are of such a nature as to make him internationally recognized as the foremost specialist in the subject. In fact, in addition to making the original descriptions of 17 afflictions of this group, he also introduced criteria for classification and characterization of 160 different types of ectodermal dysplasias that he reviewed. Crowning this ingenious work, he published, with Marta Pinheiro, the most complete book about the subject, *Ectodermal Dysplasias: a Clinical and Genetic Study* (Alan R. Liss Inc., New York, 1984, 252 pp., 60 photographic plates).

His international projection led him to exercise various relevant activities. During one year, in 1970, he worked in Geneva as a scientist in the Human Genetics Unit of the World Health Organization and continued as a member of its consultant board for human genetics. He was elected Latin American representative, from 1960 to 1968, of the Genetics Section of the International Union of Biological Sciences and a member of the organizing committee for the International Congresses on Human Genetics. He is appointed as an Honorary Vice-President of the 9th International Congress of Human Genetics (Rio de Janeiro, 1996).

In order to calibrate our admiration and respect for Newton Freire-Maia, besides considering his accomplishments, we have to look at the man, who gave vitality and substance to the scientist. Newton is a great storyteller. He narrates with relish what he has seen and heard, leading the listeners into a refined jist, conquering his audience with his verve. He remembers thousands of circumstances and incidents, quotes phrases pronounced half a century ago, all chosen with his good taste and keen perception of human nature. He is a collector of reminiscences, harvested in his daily life and in his travels through 27 countries where he has given conferences, participated in congresses, worked and even, though rarely, visited as a tourist. Newton is a world citizen who keeps on being a State of Minas Gerais provincial, a type unfortunately in extinction. With respect to himself, he is demanding, organized and slightly compulsive. His scientific metabolism, always well gauged and at the boiling point, explains his immense production.

Newton knows many people and loves those he knows. His inclusive fitness encompasses his family with affection and spreads to his disciples, friends and acquaintances in waves of empathy and solicitude. Besides this, he leans towards the common man and all the human race with a sense of solidarity that he expressed in the I Simpósio Sul-Americano de Genética, speaking as President of the Brazilian Genetics Society, in 1960:

"What a strange country is Brazil, that constructs marvelous architectonics, that forges roads through the forest, that produces scientific research of high quality and yet, in the most painful of contrasts, is a champion of illiteracy, poverty and infant mortality. How much beauty will spring forth for the families, that today install themselves in mudwalled hovels, when the social regime in which we live, intrinsically immoral because it permits and tries to justify the exploration of man by man, is substituted by a system of full justice, in which the riches, under social control, are distributing benefits to all."

Newton was Vice-President of the Sociedade Brasileira para o Progresso da Ciência (SBPC) and its Honorary President since 1989; he was a founding member, Vice-President and President of the Sociedade Brasileira de Genética and consultant for the Universidade de Brasília. He has had his biography published in several reference works, such as *Who is Who in the World* and the *American Men of Science*.

His books range from scientific popularization and textbooks to specialized treatises: *Genética Médica*,

Vol. I - Teoria, with Ademar Freire-Maia, and *Vol. II - Prática* (DESA e EDUSP, São Paulo, 1966); *Populações Brasileiras: Aspectos Demográficos, Genéticos e Antropológicos* (Cia. Editora Nacional e EDUSP, São Paulo,1967), with F. Salzano; *Problems of Human Biology: a Study of Brazilian Populations* (Wayne State University Press, Detroit, 1970), with F. Salzano; the delightful little book, *Brasil - Laboratório Racial* (Vozes, Petrópolis, 1972), that had one dozen editions; *Genética de Populações Humanas* (HUCITEC e EDUSP, São Paulo, 1974); *Tópicos de Genética Humana* (HUCITEC e EDUSP, São Paulo, 1976); *Efeitos Genéticos das Radiações no Homem* (HUCITEC e EDUSP, São Paulo, 1982), with Ademar Freire-Maia; *Ectodermal Dysplasias - a Clinical and Genetic Study* (Alan R. Liss Inc., New York,1984), with Marta Pinheiro; *Displasias Ectodérmicas: Manual para Profissionais de Área da Saúde* (Centro de Estudos de Displasias Ectodérmicas, UFPR, Curitiba, 1984), with Marta Pinheiro, and others.

The life of Newton has been dedicated entirely to science and illuminated, in the last fifteen years, by an intense religious faith. His intellectual integrity is revealed at each step but never as much as in his assuming the responsibility to reconcile his fervent catholic faith with his professional scientific conceptions, clarifying, for the sake of his colleagues and disciples, how these two pillars which sustain his intelligence and his emotion do not just coexist, but complete and fertilize one another without either one emerging diminished from the confrontation. This endeavor culminated with his latest five books: *Criação e Evolução: Deus, o Acaso e a Necessidade* (Vozes, Petrópolis, 1986); *Teoria da Evolução: de Darwin à Teoria Sintética* (Itatiaia e EDUSP, Belo Horizonte e São Paulo, 1988); *A Ciência Vista por Dentro* (Vozes, Petrópolis, 1991); *Gregor Mendel, Vida e Obra* (T.A. Queiroz, São Paulo, 1995); and *O que Passou e Permanece* (Editora da UFPR, Curitiba, 1995), his autobiography.

The reputation held by Newton outside Brazil, based on some two hundred or so scientific articles, his books and also his physical presence, since he has worked in the United States, Geneva and Portugal, is documented in the following dedication of a book by the North American authors C.F. Salinas, J.M. Opitz and N.W. Paul, (*Recent Advances in Ectodermal Dysplasias*, Alan R. Liss Inc., New York, 1988):

"The Society of Craniofacial Genetics is honored to dedicate the proceedings of this symposium to Dr. Newton Freire-Maia, Professor Emeritus, Department of Genetics, Federal University of Paraná, Curitiba, Brazil.

Newton Freire-Maia has had a remarkable impact on the study of genetics, not only in his own country but throughout the entire scientific world. Shortly after he became a dentist (1945) he began to work in the University of São Paulo, Genetics Laboratory, in a program devoted to the study of Drosophila. His interests promptly moved him into the field of human genetics and he became the first human geneticist in Brazil. In 1951 he founded a center for genetic studies that later became the Department of Genetics at the Federal University of Paraná in Curitiba. He formed a school of Human Genetics that has produced outstanding scientists working in several states in Brazil.

During 1970-1971, while a visiting scientist in the genetics unit of WHO in Geneva, he began systematic studies on ectodermal dysplasias. A product of such studies is the well-known Freire-Maia classification. When he returned to Brazil he continued a very prolific scientific career that included publication of over 100 journal articles and numerous books. Newton Freire-Maia is internationally known and honored for his work in ectodermal dysplasia, as well as for his genetic studies relating to Drosophila, population and radiation genetics, and anthropology.

It is especially appropriate to note here one of his works: Ectodermal Dysplasias: a Clinical and Genetic Study - a compilation of 108 conditions characterized by ectodermal dysplasias. The work was coauthored with Dr. Marta Pinheiro and was published by Alan R. Liss Inc., New York, 1984.

Freire-Maia is also renowned in his country for his deep sense of humanity. He is a kind and caring person and a wonderfully affectionate friend to hundreds of people throughout the world. The wellspring of his ethical-moral views in personal and professional life is deeply religious. Freire-Maia is a scholar and humanist of great culture with deep feeling and a marvelous sense of humor. Perhaps the most remarkable characteristic of this remarkable man is that as a true pioneer he has never hesitated to give total support to those who follow his pathway."

My dear Newton: this meeting has been a great joy for me because it has allowed me to sketch for the young geneticists of Brazil, who you are. We shall always revive the theme of this night with pleasure, exchanging recollections as brotherly companions in our journey through life.

(Presented at the Opening Session of the 41st National Genetics Congress, Brazil, 1995)

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