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*Jose L. Guerrero*
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Volume 1
Jose Algue Sanllei, S.J.
(1856-1930)

His courage and his tact defended the scientific establishment entrusted to his administrative abilities and won for him the admonition and respect of his contemporaries. For this, if for nothing else, his recognition of his skilled greatness and prominence is well deserved. But history demands that we render a man his full measure of recognition, and Jose Algue in focus projects an excellence in scientific skill and leadership as well.

On January 29, 1879, exactly a week after the death of Federico Faura, S. J., a new director of the Manila Observatory was appointed, the forty-one-year-old Jose Algue, S. J. This directorship came in the midst of tension and bloodshed. The entire archipelago was going through the throes of a bloody revolution that was to culminate in the transition of sovereignty from Spain to the United States of America. In barely fifteen more months the naval artillery of the American Fleet was to destroy the Spanish squadron off Cavite and assume control of all of Manila Bay. At the time, the observatory occupied a site in the district of Ermita, an unfortified section outside Intramuros, and in direct line of possible attack against the heart of Manila. As hostilities worsened, the Jesuit community was forced to seek refuge in the Ateneo de Manila, within the Walled City but Father Algue, convinced of the general advantage of sustained weather forecasting decided to remain with the Observatory. By then there was more than a scientific reason to compel him to stay. The street in form of the Observatory had just been named Calle Padre Faura, in honor of his mentor and brother an arms whom he admired and respected. He would not abandon the work so dear to Faura’s heart.

Six other Jesuits stayed behind in Ermita, Fr. Marcial Sola, recently appointed assistant director in charge of seismology; Fr. John Doyle, sub-director; and four lay brothers. By this time the American firing lines were closing in from the South. As it turned out neither the Filipino insurgents nor the American infantry modested anything. In fact, the Observatory became a refugee center for some fifteen hundred of more residents of the neighborhood. As a result, almost all the naval officers of foreign ships marooned in Manila Bay during the blockade of the city of Manila... (May 1 to August 13, 1898) visited the Observatory in open appreciation for its courageous services. One practiced result of those visits was the commendation and assurance, from Rear-Admiral Dewey himself, of immunity from naval bombardment. In November of that same year, an interview was arranged between Admiral Dewey and Fr. Algue through the efforts of professor Becker an American geologist and friend of Dewey. The meeting was highly successful. The Admiral not only agreed to protect the Jesuit missionaries of Mindanao, but also approved the idea of maintaining the Observatory as the government entity that it had been during the Spanish regime. In fact, it was the tact and confidence of Director Algue that saved the
Observatory from the adversities of war and political chaos of the day, at the same time, upholding its high level of scientific competence.

In 1899, the Schurman Commission arrived in the Philippines to gather first-hand information about the archipelago and make recommendations for the creation of a form of government adapted to the requirements and needs of the country. This commission had been created by order of President McKinley on January 20, 1899 and included Jacob G. Schurman, Admiral Dewey, Major General Elwell S. Otis, Charles Denby, and Dean C. Worcester. The last two members were especially impressed by the activities of the observatory and required Father Algue to draw up organizational plans for presentation to the President of the United States. Denby and Worcester suggested an independent Philippine Meteorological Service with Fr. Algue as director and the Manila Observatory at the central office or Weather Bureau, May 22, 1901 saw the birth of this Weather Service.

While in Washington, D.C., Fr. Algue not only made the representations planned by the Schurman Commission but also found time to edit El Archipelago Filipino and the Atlas de Filipinas. Published by the Government Printing Office, the data and information contained in these works were reproduced at Parts III and IV of the report of the Schurman Commission. The two publications carry immensely valuable information on the geography, history, ethnology, culture, and the more updated researches on climatology, seismology, and terrestrial magnetism affecting the Philippines. The Atlas was also the first complete manual to be published on Philippine cartography.

Momentarily, during the early part of the American occupation of the Islands an untoward situation placed Fr. Algue and his staff in a bad light. Since 1880 when the submarine cable had been completed between Manila and Hongkong, weather reports between the two cities were frequent. However, the German Director of the of the Hongkong Observatory, Wilhelm Doberck, from the time the assumed the position, tried to discredit the work of the Manila and Zikawei Observatories. The strained relations went on for almost twenty years, and reached a scandalous climax in March, 1899 when Doberck’s libelous accusations were directly communicated to the authorities in Washington, D.C. Fr. Algue soon received an order to cease all foreign meteorological notifications. Almost immediately, however, the Asian press, the commercial and maritime communities, and even the diplomatic corps came out in defense of the Manila Observatory and protested the imposed suspension of weather announcements. Doberck’s objectional assertions were critically disputed by the British colonial government, who at this point was regretfully embarrassed, if not infurished, by the whole incident. Hence, the following communication was addressed to Fr. Algue:
Manila, P.I.

April 3, 1899

Father Jose Algue

Director of the Manila Observatory Manila, P.I.

Reverend Sir:
The Military Governor directs me to inform you that the following letter has been received referring to the prohibition enjoined upon you in the communication from the office of the Provost Marshal, February 27, 1899, not to send typhoon warning to Hongkong.

Colonial Secretary's Office
Hongkong, 28 March 1899.

Sir: - It having been brought to the attention of this government that in consequence of a request made by the Director of the Hong Kong Observatory to the Chief of the Weather Bureau, United States of America, His Excellency, the Military Governor of the Philippines, has ordered the discontinuance of the transmission of typhoon warnings from the Manila Observatory to Hong Kong, I am directed to state that the request of the Director of the Observatory in this Colony was unauthorized by this Government and that the mercantile community has intimated through the local Chamber of Commerce their appreciation of the telegraphic warnings conveyed by the Manila Observatory and the extreme regret with which they would view their discontinuance.

Under the circumstances I hope that the order for the discontinuance of meteorological intimations may be rescinded.

I have the honor to be,
Your obedient servant,
(Signed) J. H. Stewart Lockhart
Colonial Secretary

To the Secretary of the
Military Governor in the Philippines.

The Military Governor desires me to say that it gives him pleasure to remove the cited prohibitions, and directs that you send out the typhoon warnings so much desired in Hong Kong as formerly and prior to February 27 last.
Very respectfully,

E. Otis
Major and Inspector, U. S. V., Secretary.

The storm of protests that this unpleasant incident aroused proved in no uncertain terms the confidence that the community, specially business and maritime, had in the scientific competence of the director and staff of the Manila Observatory. The volume of commentaries and replies from various sources defending the activities of that institution was sufficient to warrant their compilation and subsequent publication in the El Servicio meteorologico del Observatorio de Manila, vindicado y rehabilitado. The Observatory’s own, grateful but brief response to such unsought tokens of appreciation was published in the Manila Times, in a letter bearing Father Algue’s signature. The closed with the following note of grateful and dauntless spirit of resolution:

We do not extol our own ability, nor do we pretend to magnify our work; but notwithstanding this, we trust that the Manila Observatory will prove itself to be in the future as useful and beneficial to the Colon of Hong Kong and to be Philippines Islands as it has been up to the present.

Father Algue’s preparation for work at the Manila Observatory acquired added momentum with the early demise of its subdirector, Fr. Martin Juan, S. J. The months after Fr. Juan’s ascent of the over nine thousand feet of Mount Apo in Davao he fell victim of a fever, passing away in Surigao on July 9, 1888 at the early age of thirty-eight. Father Faura, the Observatory’s first director, then decided to make definite arrangements concerning Father Algue’s studies in astronomy. Both were at the time in their native Spain. Fr. Faura brought the young Algue with him to visit the astronomical observatory in Rome that same year of 1888, and in September of the following year they both attended the International Meteorological congress in Paris. For two years Algue continued his studies in Spain until June 11891 when he was assigned to work at the astronomical observatory of Georgetown University in Washington, D.C. While there he was to undergo training under three noted Jesuit astronomers, Hagen, Fargis, and Hendrick. He spent one summer studying German in Buffalo, New York and for almost three weeks in 1893 he stayed at the Jesuit observatory of Havana in Cuba. There he was able to learn, note down, and discuss topics on hurricane with the Jesuit meteorologist Fr. Viñes.

By the middle of May, 1893 Algue left American shores for Europe with the Special mission of finalizing the details for the Manila Observatory. On July 28, however, he had to accompany Fr. Faura once more to represent the Observatory at the Meteorological Congress in Chicago that formed part of the celebrations of the Columbian Exposition. From Chicago the party made a brief stop at Buffalo, sailed from New York to Havana and after some months in the
Cuban observatory left on December 10 for Barcelona. The New Year of 1894 saw them in their own country, but after five days they left for Manila.

One of the most cherished projects of Fr. Faura was the setting up of an astronomical section at the Manila Observatory. It was for this purpose that Fr. Algue, even while studying at the Georgetown Observatory, was commissioned by Faura to sign a contract with the Zaegmueller firm for the construction of the tube and the mounting of a 19-inch lens of the equatorial telescope. This telescope was finally installed at the Manila Observatory and first operated the evening of February 16, 1899, twenty-five months after Father Faura’s death.

It was likewise during his stay at the Georgetown Observatory that Fr. Algue constructed and used a zenith telescope which, as the name implies, is designed for use at or very close to the zenith. This type of telescope is employed primarily for the accurate determination of terrestrial latitude. On his arrival in Manila he had installed in a small annex at the east end of the astronomical building. However, other pressing duties and the lack of trained personnel to help him handle the instrument prevented his using it to the utmost. An advantage of this particular zenith telescope was that it did not require manual manipulation once it had been set to photograph the path of the stars through a given meridian. A further improvement on the telescope was made by attaching to it a photochronograph designed by Father Fargis, S.J. of Georgetown Observatory.

When Father Algue returned to the Philippines on February 3, 1894 little did he suspect the varied activities awaiting him. Father Faura, the director of the Observatory, acquainted him with his new duties as sub-director, and within a few months was pleased to note the considerable work that Father Algue had accomplished in the field of meteorology. In barely three years our young scientist published a valuable monograph entitled Baguio o cyclones Filipinos. This 1897 publication was based on collated data and earlier studies undertaken by Fr. Faura on typhoons. Fr. Algue’s main purpose was to make available to the public, the valuable information which an analysis of typhoon data gathered by the Observatory since its establishment in 1885 had to offer. He had in mind particularly: “…those who sail through these tempestuous seas and …the inhabitants of islands so beautiful but subject to such disastrous typhoons.

The first edition contains three parts. The first deals with the nature of typhoons which includes their genesis, their trajectories, and an attempt to classify them. This theoretical section is followed by some practical norms, found in part two, which serves as a guide to the meteorologist, in diagnosing the presence of “beguios”. Among the predictive phenomena discussed by Algue are the presence of cirrus and cirro-stratus clouds and their direction, the fluctuations of the barometer, and the barocyclonometer. The third part of the book presents case studies from the Observatory records of typhoons that
confirm the principles discussed in the first two parts of the work. An analysis of anomalous or freak typhoons is presented in the last chapter of this section.

This monograph of Algue was well received by the scientific community both here and abroad. In no time the meteorological offices of Germany, France, and England requested formal translation of the work, leading ultimately to a revised edition is used in 1904 under a new title, The Cyclone of the Far East. As the author indicates in its Preface, this new and improved edition extends to the Far Eastern neighbors of the Philippines, the benefits of meteorological observations conducted by the Manila Weather bureau. This new edition adds a fourth part of the 1897 edition, and deals with the practical rules of navigation in the face of typhoon conditions. Included too is a descriptive list of the ports of refuge in the Far East, particularly those in the Philippine Archipelago. Among the other minor studies found in Part IV of the book is a new classification of the cyclones of the Far East, and the relation between some microseismic movements and the progress of cyclones. This last topic was also the subject of a paper presented by Algue during the 1900 International Congress of Meteorology. He presented it under the title Relation entre quelques mouvements microseismiques et l’Existence la Position et la Distance des Cyclones a Manille (Philippines).

It is in this monograph on typhoons that Algue discusses the construction and value of the barocyclonometer, which is an improvement on Faura’s own aneroid barometer and of an instrument designed by father Viñes of the Belen Observatory of Havana. Algue adapted Viñes apparatus to fit Philippine cyclonic conditions. The barocyclonometer is basically an aneroid barometer with a adjustable scale and a legend indicating typhoon and wind data. Barometer readings are synchronized with the wind and typhoon data by a set of movable needleless.

In time the barocyclonometer became a “must” with mariners and all inter-island vessels were equipped with it. For navigators it was an important device for determining with her greater accuracy than was possible with the use of the ordinary barometer together with the insights of personal experience, the distance and direction of the center of typhoons. The instruments was exhibited at the St. Louis (Missouri) Centennial Exposition of 1904 where it won for its designer and the Philippines the Grand Prize. In 1912, the Bureau of Navigation of the United States Navy in Washington, D.C. in recognition of the valuable results obtained from its use in the Far East, proposed its adoption in Atlantic waters. As this step required special research on specific environmental data, archival visits to meteorological centers in London, Havana, and Washington were deemed necessary. Father Algue then commissioned Henry Hughes & Sons, Ltd., marine opticians of London, to construct a modified version of this apparatus and this was followed with the publication of a paper on The Barocyclonometer for use in the North Atlantic. In later years when radio communication was applied to ships the position of typhoons was received directly from observatories hence, the use of the barocyclonometer declined. Its utility, however, continued especially for inter-island vessels plying in Philippine waters, and in remote mining stations.
A year after the publication of the study on tropical typhoons, Algue published another important contribution to Philippine meteorology. The outstanding treatise entitled Las Nubes en el Archipielago Filipino included a research project on cloud measurements sponsored by the International Commission of Meteorology. Sixteen countries took part in the project, and the Manila Observatory was the only representative for the Far East. Mr. H.H. Hilderbrandson, President of the Commission, published the following observations on Father Algue’s manuscript.

Your work on cloud observations for the period 1896 to 1897 is the first complete treatise of its kind up to now. May I request for another copy of your publication which I intended to present to the International Commission during its meeting in St. Petersburg on September 2 of this year.

Reporting to Algue on the way his work was received by that international body, Mr. Hiderbrandson wrote in a letter of September 22:

Your publication on clouds has been received with both admiration and enthusiasm of a high kind by all the members of the International Commission gathered in St. Petersburg. Their regard was heightened by the realization of the enormous difficulties you had to overcome while undertaking this so important piece of work.

In this rather extensive study on clouds in the Philippine archipelago Algue discussed many important aspects of this phase of meteorology, among them cloudiness as observed in the Manila area: their effect on solar radiation during the morning and afternoon hours; days with maximum solar brightness in Manila; relationship between clouds and heat waves; cloud direction, including observations on the general movement of the atmosphere in the Manila area and in various latitudes of the northern hemisphere; clouds distance and velocities, and the relationship between cloud height and atmospheric pressure as well as cloud direction. An optical instrument thoroughly studied by Algue as part of his research work on clouds was the nephoscope, which determines the velocity, elevation and direction of motion of clouds.

Fr. Charles E. Deppermann, S.J., in an article published in 1951 on Fr. Algue’s contributions in the field of seismology asserted that as early as 1894 Algue was already studying microseisms in relation to typhoons. Fr. Deppermann cites the portions of the tenth chapter of the second revised edition of Algue’s Cyclones of the Far East to support his thesis:

We call attention to the intimate relation there appears to be between the resistance offered to the cyclonic winds by mountain ranges and microseismic movements.
A notable fact points out this relation. In the adjoining map of Luzon (plate XLVIIa) the track of a cyclone has been divided into parts corresponding to the movement of the storm every two hours. In the lower part, curve a represents the velocity of the wind in meters per second; the upper curve B represents microseismic movements observed on the Bertelli Tronometer, each division representing an angle of 14 seconds.

Examining the curves we note the following important facts:

1. The greater or lesser amplitude of the oscillations does not depend on the greater or lesser force of the wind in the locality; for in the cyclone the maximum oscillation of the tronometer was observed at 12:30 a.m. whereas the maximum velocity and force of the wind was not observed until nine hours later.

2. The mean value of the microseismic oscillations is incomparably greater while a cyclone is crossing the land than it is when crossing the sea.

3. The greatest oscillations are observed when the cyclone is passing the great mountain ranges.

From these facts it would appear that the enormous resistance offered by the mountains to the cyclonic winds which blow, at the approach of a cyclone from the fourth quadrant, almost perpendicular to the ranges of mountains in the district of Principe, causes a huge mass of the earth's crust to vibrate and the vibrations thus caused being transmitted to a distance are made perceptible by the great sensitiveness of the Bertille tronometer. The effect of the wind blowing against the mountains of Zambales is also perceptible in the same instrument.

Observations with the tronometer are made every hour of the day and night and have been continued since 1884.

The experience gained from the effect of cyclones on the microseismic apparatus of the Manila Observatory could help us in choosing the most suitable places for installation of tronometers as an apparatus giving indications of the existence and approach of tropical cyclones.

Years later, at the Paris Exposition of 1910, Fr. Algue offered a more definitive study on "Microseisms and the position of typhoons. J.R. Gobeima, S.J. of the Belen Observatory, in a communication to Fr. Deppermann pointed out that Algue was regarded by a good number of authors as the pioneer in this particular aspect of meteorology correlating seismic with cyclonic phenomena. The observation becomes all the more significant when we consider that meteorology as an autonomous scientific discipline in European
Centers of learning made advances only towards the end of the XIX century. As a matter of fact, the first congress on meteorology was convened only in 1853.

The many duties and assignments of Father Algue both as a scientist and as an administrator did not prevent him from sharing his knowledge and experience with others through his writings. He wrote reports on different occasions on typhoons which were of interest to both scientists as well as laymen. A year after his arrival in the Philippines he published a work on the cyclones that visited the Island in 1894 and an account of the typhoon that struck northern Luzon on July 11, 1884. This was one of those freak typhoons that take unexpected paths so that even areas generally regarded as safe become victims of its fury. Among the vessels caught in its unsuspected paths was the Spanish cruiser Gravina. The dexterous manipulations of its captain, Don Jose Garcia de Quesada, saved the crew from disaster, but subjected him to a naval Board of Inquiry. Father Faura spoke in his defence and proved the innocence of the accused so ably that Quesada was judged by the Board as innocent of the charges of negligence and incompetence. In grateful appreciation of this act Commander Quesada later donated to the Manila Observatory an oil painting of Our Lady of Mount Carmel which the Gravina crew venerated as their patroness. The typhoon of 12-13 October 1897 that hit Samar and Leyte and the one of May 23, 1922 that struck the Manila area were also discussed by Algue in separate monographs. The cyclone that visited Hong Kong on September 18, 1906 was reported by him in a publication issued that same year. On the occasion of the fourth centenary of Magellan’s discovery of the Philippines, he delivered a paper in a conference on January 31, 1921 which was printed in the official publication commemorating the celebration. The National Geographic Magazine is one of its issue for its twelfth volume, contained Algue’s historical account of the Manila Observatory. The Manila Observatory station in Mirador, Baguio City, likewise merited Algue’s attention in a pamphlet dated 1909. His report on the meteorological services of the Manila Observatory under the new American regime was published by the Government Printing Office of Washington in 902. The eruption of Taal Volcano on January 30, 1911 led him to publish a study of that event in relation to the weather changes it brought about.

In the fall of 1900 Algue attended the Meteorological Congress organized in Paris as representative of the newly installed Insular Government of the Philippines and the reascent meteorological service. It was during that scientific convocation that Algue described his own barocyclonometer. He took this opportunity also to visit the chief scientific institutes in the French capital and commissioned Ducretet and Company to construct his most recent model of the nephoscope.
At the Saint Louis Centennial Exposition of 1904 (held at Saint Louis, Missouri), the Philippine materials displayed attracted more than ordinary attention. The exhibit of the Manila Observatory was exceptionally good. This was housed in a building 33 by 33 feet and prominently displayed a Vicentini three-component seismograph, one of the earliest instruments of its kind to operate in the United States. Also within this building were exhibited a complete meteorological setu, relief models of the volcanoes of Taal and Mayon, a relief map of Manila Bay, a 6 by 13 feet map of the Philippine archipelago and many assorted tables, curves, graphs. Outside the building Father Algue and his staff displayed a large relief map of the Philippines measuring 100 feet in length and 65 feet in width, moulded in concrete. This relief map was viewed from a gallery that surrounded the map area. Two steel towers equipped with weather instruments completed the exhibit. This corner of the Exposition received more than its share of awards. The Philippine Weather Bureau won a Grand Prize as a model weather and seismic Station of the First Order. Another Grand Prize was awarded to the Manila Observatory for the huge relief map of the Philippines and other cartographic materials. Father Algue himself was given a Grand Prize for the barocyclonometer nephoscope, and a gold medal for an improved microseismograh made under his direction by the technicians of the Observatory. A third gold medal was awarded to him for a collection of mounted specimens of Philippine woods. Father Mariano Suarez, S.J., then director of the seismic department, won a gold medal for his seismic pendulum. The curator of the Observatory Exhibit, Mr. Ramon Lacson, a graduate of both the Ateneo de Manila Georgetown University also shared in the honors of the staff with a gold medal award.

Following the experience at Saint Louis, a year after his return to the Philippines, a Regional Exposition was held in Manila (1895). Here the Manila Observatory presented to the public an array of its instruments, books, and drawings. In 1902, as director of the Observatory, Fr. Algue was in charge of the Observatory’s exhibit at the French colonial Exposition in Hanoi, Indo China. The Observatory then exhibited four valuable maps, a dozen books, four important photographs, A typhoon barometer and two barocyclonometers. Twenty years later, Algue helped to set up the Vatican Missionary Exposition held on Rome in 1925. The Observatory sent a large table of Philippine hard wood which was later on used in the signing of the treaty between Italy and the Vatican.

On July 11, 1905 Father Algue sailed for his native Spain in order to observe a total eclipse of the sun scheduled for August of that same year. He joined the astronomical group that set up its station at the Island of Palma de Mallorca in the Mediterranean, a spot in the path of totality. He then proceeded to Innsbruck in Austria to attend the Meteorological Congress of Observatory Directors. Algue was likewise the representative of Father Froc, S.J., then directing the Zikawei Observatory of Shanghai. The focal point of the congressional debates was the publication of an International
Meteorological Code of Laws to cover all resolutions enacted from 1872 to 1919. Algue proposed a separate Spanish edition aside from the official publications in German, French and English, since there were a large number of observatories throughout the world where Spanish was the official language. The assembly approved the motion and Father Juan Comellas, S.J., then subdirector of the Observatory of Manila prepared the Spanish text. By 1913 the manual was ready for circulation under the title Codigo Meteorologico – Resoluciones Adoptadas en Conferencias y Congresos Meteorologicos Internacionales, 1872-1910 preparado por encargo del Comite Meteorologico. This Spanish edition was based on the second German edition and was published by the Bureau of Printing in Manila.

His significant activities as a scientist brought him recognition from the scientific community both in the Philippines and abroad. He was made honorary member of the Royal Meteorological Society of London in 1906. insignias of doctor of Science the highest tribute that this University can offer. In 1910 the Italian Academia Pontificia de Nuevo Lincei in Rome included him among the its corresponding members. On March 7, 1912, Dr. Barlette, first President and Rector of the University of the Philippines, conferred on Father Algue the degree of Doctor of Science, honoris causa. Speaking on behalf of a gratefully community Dr. Bartlett remarked:

In recognition for your outstanding services to the Filipino people I impose on you the hood and

Doctor Algue was the second recipient of such an honor from the State University, the first being don Cayetano Arellano, Chief Justice of the Philippine Supreme Court.

On July 24, 1921 Father Algue celebrated his fifty years as a member of the society of Jesus. Less than a year, he made what was to be his last trip thorough the Far East. He made a tour of the observatories of Hong-Kong, Indo China and the Indian Meteorological Office. While in India he also represented the Jesuits of the Philippines at the third centenary of the canonization of Saint Francis Xavier held in Goa on March 12, 1992.

Both age and labor began to take their toll. On September 14, 1924 Fr. Algue bid the Philippines a last farewell. He stopped in Rome to visit the Vatican Missionary Exposition and then settled in his native Spain. Failing eyesight and other infirmities set in and on May 27, 1930 he passed away at the age of seventy-four. His last days were spent in the quiet surroundings and scientific atmosphere of the Jesuit Observatorio del Ebro in Tortosa, among the hills and countryside of his native Cataluña. He was born in Manresa, a spot memorable to all Jesuits, where their founder, Ignatius of Loyola, had started on a new course in his life after having given up a career in the imperial armies of Charles V. Algue’s birth on December 22, 1856 was also a year of celebration for the Society of Jesus throughout the world. That year marked the third centenary of Loyola’s death.
Fr. Algue’s novitiate as well as his literary, and philosophical training as a Jesuit were made outside his native country in Toulouse, France. The liberal cabinets dominating Spanish policies during a good part of the second half of the nineteenth century had banished the Jesuits from its domains during Algue’s years of Jesuit formation. Despite this, he spent seven years as a teaching scholastic in the Colegio del Salvador in Zaragosa before starting his five years course in theology. On completion of his theological course he spent a year in Barcelona learning mathematics under the reputed professor Dr. Clariana. Then he was sent to Georgetown University for the specialized studies described earlier.

The merit of Father Algue may be measured by his rare brilliance, which was alive and aflame with an unflagging drive and determination; by the universal quality and sheer foresight of his scientific endeavors; and by his keen sense of identity to the problems and urgencies of his won time. As expressed by one of his biographies, Algue’s life was one filled with service, of self-sacrifice, constant dedication to scientific endeavors and investigations, and sincere loving concern for all. His thirty years of service to the Philippines included twenty seven as director of the Manila Observatory. His predecessor, Father Faura had nursed the Observatory through its early stages of development; Father Algue was destined to lead it through its adolescent, more restless years of growth. These were years that encompassed very significant events in our national history, the passing away of an entire era with the close of the Spanish colonial period and the growth of nationalism during the first half of the American War, and during the years of peace built up the staff, the instrumentation and the reputation of the Manila Observatory. Amid the animosities and acrimonies of years of unrest he won the respect, the admiration and above all the friendship of those who had to deal with him, Filipinos, Spaniards and Americans alike. His generation held him up in pride, ours cherishes his memory with grateful respect.

NOTES

1. In 1865 the Observatory started very humbly with typhoon and climatological observations collected and made available to the public by two young Jesuits, instructors at the Ateneo Municipal, Francisco Colina and Jaime Nonell. A year later, a third Jesuit Scholastic, Federico Faura, arrived in Manila to teach science and take charge of the meteorological work. The observations grew in number and importance so that by 1879 Fr. Faura, recently arrived from his years of theological and scientific training, issued the first public typhoon warning. The service was so well received by the business and scientific communities that by April 26, 1884 a Royal Decree established a government Weather Bureau with the Jesuits of the Manila Observatory at its head. (See, James J. Hennessey, S.J. “(The) Manila Observatory”. Philippine Studies, 8 (Jan. 1960) 99-120; W.c. 1948; Miguel Saderra Maso, S.J. (El) Historia del Observatorio de Manila, (Manila: E.C. McCullough & Co., Inc. 1915).

2. A letter written February 2, 1899 abroad the U.S. Flagship Olympia said in part:

   I trust that the United State government will make the necessary provisions for the continuance of the institution which you conduct in such an able manner, and which has proved itself to be so grat a benefit to maritime interests in this part of the world.
4. Father Hagen an Australian by nationality was promoted in 1906 from Georgetown Observatory to the office of director of the Vatican Observatory in Rome.
5. An equatorial telescope is one so mounted that it may be moved parallel to the equatorial coordinates of hour angle and declination. The mounting of an equatorial telescope is such that one axis (the polar axis) is parallel to the axis of rotation of the earth, and the other axis (the declination axis) is perpendicular to the polar axis. The telescope may be rotated about the declination axis.
   Since time and hour angle are practically synonymous (the hour angle, for instance of the mean sun is the local mean time) the determination of the hour angle is most important for the determination of local time and longitude.
6. The zenith is the point on the celestial sphere directly overhead of the observer.
7. A chronograph is an instrument for writing time. It includes a rotating drum with a pointer connected to a standard clock. One of its uses is to record vibrations from earthquakes.
8. Meteorology is the science of the atmosphere in all its aspects. In a more restricted meaning (which is in wider use) it is the science of weather, being specially concerned with the physics of the elements which make the weather.
10. Federico Faura’s aneroid barometer a forerunner of Algue’s barocyclonometer, is described extensively in the appendix to the Cartas de los Padres de la Compañía de Jesús dela Misión de Filipinas, vol. VII (Manila: Imprenta de los amigos del País, 1877) p. 309-325.
   A barometer is an instrument for determining directly the pressure of the atmosphere and indirectly for evaluating the probable changes in the weather as well as the height of an ascent. The aneroid barometer (also simply known as aneroid) is actuated without the use of a liquid. It measures atmospheric pressure in terms of the distortion this produces on a metal piece.
   A barocyclonometer is a form aneroid barometer used in conjunction with a dial with adjustable arrows to determine the location and movement of a tropical cyclone.
11. Imprint: Manila: Bureau of Printing, 1913 (Algue had also published a booklet on The Barocyclonometer in general, the first edition appearing in 1904, and another in 1920, both out by the Bureau of Printing in Manila).
14. Ibid.
16. Microseisms are rhythmically recurring tremors of the earth too feeble to be detected by the unaided senses, requiring of an instrument like a tronometer or a microseismometer.
17. A tronometer is a device for measuring or detecting minute earth tremors.
23. Jose Algue, S.J. (La) Navegacion y la meteorologia desde el viaje de Magallanes (Manila: Bureau of Printing, 1921).
27. Jose Algue S.J. Phenomena accompanying the eruption of the Taal Volcano January 30, 1911, Quarterly J. Royal Meteorological Society, 37 (1911) 273-274.
28. this seismograph was sent back to Manila after the Exposition and in 1909 was installed at the Mt. Mirador seismic station of the Manila Observatory in Baguio City.
29. He arrived at the Manila Observatory in 1906 after studying at the Georgetown University Observatory under Fr. Hagen. He was assigned at the astronomical section where he worked continuously for twenty years.
30. G. Hallmann and H.H. Hilderbrandson were the editors of that German edition.
32. ..(una) vida llena de actividad extraordinario, de gran abnegacion, de continuos estudios y empresas cientificas, de inventos utilisimos y vida finalmente infromada de ardiente caridad para con el proyimo.. “Jose Ma. Clotet, S.J..” P Jose Algue Sanllei, S.J. p. 311.

### SCIENTIFIC CONTRIBUTIONS

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<td>1900</td>
<td>(Las) Nuges en el Archipelago Filipino colaboracion al trabajo internacional de medicion de nubes (10 junio de 1896 al 31 julio de 1897 Manilla: Tipolitografia Privada del Observatorio</td>
<td>191p.</td>
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<td>1901</td>
<td>Relacion entre quelques Mouvements Microseismiques et L’Existence la Position et la Distance des cyclones Congress International de Meteorologie de Paris 1900. 6p.</td>
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The year 1966 marked the first hundred years of the birth of Fernando Calderon a man who played a valuable role in Philippine obstetrics. By the time he was a man of forty the maternal fetal death rates had reached high levels in our country. His professional competence and zeal however, played no small part to turn the tide in favor of life.

As late as 1907 the majority of deliveries were done at home. Lying on a straw mattress, or on the bare bamboo floor, the laboring mother had no germ-free surroundings to help her bring new life to earth. There were no sterile gauzes or surgical instruments, no impeccably clean nurse, or a alert obstetrician in attendance, neither fast-acting sedative or anesthetic to ease the labor pains. At most there was a basin of hot water, some towels, and the attending comadroma or hilot. The would-be mother was not only an easy target of infection, but was also surrounded by an invisible curtain of superstitious beliefs that added anxiety to her growing physical pains.

Even during her long months of pregnancy, the mother was forbidden to eat tutong (rice crust) for fear of a delayed expulsion of the placenta. When voiding urine she had to be careful to pour water over it lest the smell draw the asuang who would be instrumental in producing hemorrhage during her labor period. During her hours by the home stove she had to store the large end of the firewood first to avoid a breach presentation during delivery. Neither was she allowed to carry coins under the folded waistband of her skirts for otherwise her child would be the months of her pregnancy she had to undergo the pagbubungkal, a very dangerous manipulation which consisted in turning the baby in the womb so as to place it along the median line of the mother.

With the onset of labor the attending midwife rubbed the parturient's body with her bare hand, and saw to it that a lamp was lit under the house to drive away the asuang. The hilot would then ready one of there many types of drink to ease the labor of childbirth. A drink of eggyolks was often given to strengthen her physical condition. A portion of uncooked cocoa, pure chocolate, or human milk was prescribed to reduce labor difficulties. Some hilot's gave a decoction of cogon roots or a bagabaga leaves for the same purpose. Others prescribed the taking of twelve buyo leaves together with one raw egg, while another egg was applied over the abdomen as a poultice. At times, the twelve buyo leaves were crushed, mixed with milk, and applied as a rubbing.

During the entire period of child labor no one was allowed to stand by the doorway of the room for fear that the child might stop at the pelvic opening. As the house grew shorter the midwife resorted to palpation to localize the infant. She pressed and pushed so as to slide the child against the abdominal wall. Such laborious massage would sometimes need the assistance of another strong adult. The violent compressions and expressions of the uterus with the hands, or at times with a piece of wood, often bruised or wounded it and brought about a too rapid expulsion of foetus and resulted in lacerations. If labor was difficult some rather repulsive measures were taken. Dr. Benito
Valdez reported to Dr. Calderon the case of a parturient who was brought to him in critical condition. She had contracted tetanus. Some time before, the hilot had made her drink a decoction of horse manure to ease her labor pains. The patient died shortly afterwards. These would include, for instance, the drinking of dog urine or horse or cow excrements crushed and mixed with water or wine. During the process of drinking, the woman had to hold some amulet. Like a jasper stone.

When the child finally came to term, its umbilical cord was not cut until the placenta had been expelled. This was then buried in a hole that held it snugly. A large burial pit meant that the newborn would be a glutton; too small a hole, that the baby would have poor appetite in years to come. Sometimes the placenta was used as medication. It was cut in pieces, boiled, and given to a primipara as a preventive of diseases during the puerperium. When the placenta was thrown into a river the health and strength of the baby was assured. If wrapped in paper and accompanied by a pen or book and then buried, the child would become a wise man in his adult years.

Among the Ilocano and Tagalog tribes the mother was then given the saklap or salap treatment. This consisted in the mother undergoing a steam bath to produce profuse perspiration. Many became anemic after such a treatment. If the bath brought about serious illness the hilot ascribed this to an improper "cooking" of the patient.

A safe delivery did not insure the child from early death, nor did it liberate the mother from the taboos imposed by the midwife. During the long months of lactation the mother could not nurse her baby after cooking or ironing since the heat was believed to cause changes in her milk. Breast milk would turn bad after several hours and therefore its first flow had to be rejected when feeding the baby. Her diet was strictly regulated, specially by avoiding all sour foods which were thought to coagulate her milk and produce colic conditions in the baby. Hyperlactation was stopped by wearing an amulet from the neck, either a key or a few flowers of the papaya.

These long entrenched practices were not easy to eradicate. But a greater difficulty for Dr. Calderon and his generation of Filipino obstetricians was, to convince the parturient women and their relatives to a hospital for delivery, and stay there a few days after. This reluctance was due in part to an excessive attachment to their homes; to a mistaken loyalty to their family and to the false tales then current about obstetrical practices in hospitals. Many believed that the parturient was always operated upon, and was left in wards where her bed was close to a dying patient. To these obstacles were added the ignorance of a good number of women in matters of hygiene, and their unwillingness to call a physician except when in very serious condition. In an effort to win over these women exposed to obstetrical malpractices, particularly among the poorer classes, Dr. Calderon had to use not only persuasion but obstetrical competence wrapped with sympathy and patience. Yet there were times when he had to swallow the bitter goal of frustration because he had been child, but called too late for effective human remedy.

However, during his lifetime he had the satisfaction of witnessing a change of attitude toward the obstetrical particularly among the poor. This was partly the fruit of his efforts during his years of service with government agencies. He had by then organized a three-pronged attack to the problem: (1) service for out-patients in need of obstetrical assistance; 2) distribution of literature among the poor Filipino women in Manila; and 3) lectures in various health-centers of that city. Then he was already aware of the need of extending these programs beyond the capital boundaries to all provinces of the archipelago.

The following tabulated summary shows that Dr. Calderon’s ambition of continually improving the health of the Filipino was not simply a dream.
In 1866 Kawit, Cavite measured progress in terms of the horse-drawn calesa, the carabao cart, and the paddled banca. But on August 14 the pace of living in Tanza, kawit, was livened up by certain events. The relatives and friends of don Jose Calderon and Doña Manela Roca had that year began to anticipate the joyful religious celebration in honor of the Assumption of Our lady of which fell on the fifteenth. They were also happily concerned with the new baby boy of the Calderon family. As that boy grow into early adolescence his parents could not fail to notice his eagerness and his attention for intellectual growth. Rather than dampen such zest for learning they decided to send him to Manila even though this meant a strain on the family coffers. Fernando was admitted to the Ateneo de Manila where he successfully completed his college training. In 1885 he had won the Ateneo’s diploma of Bachiller en Artes.

His strong ambition spurred him on. He remained a student at the Ateneo and in two more years he was the proud holder of two other titled, that of Perito Agronomo and Perito Mecanico, corresponding today to diplomas in agricultural and mechanical technology respectively. Young Calderon’s eyes were by then also set on a university career. Limited family resources did not discourage him. He enrolled in the Faculty of Medicine of the University of Santo Tomas, and worked his way through the long years of medical training. The sacrifice made his university degree all the more dear to him. On march 22, 1891, at the age of twenty-five, he received his Licentiate in Medicine.

Our Licenciado Don Fernando Calderon y Roca did not continue towards his doctorate in medicine. The academic expenses involved wer quite high and the degree entailed a long trip abroad. Before the American regime, the University of Santo Tomas, following the requirements of the Ministerio de Educacion, demanded the completion of the Bachiller en Artes, before the medical program could be started. This medical program consisted of one year of Aplicacion (pre-medicine) and five years’ of medicine proper. At the conclusion of the six full years the candidate received the title of Licenciado en Medicina, a degree which not only certified to the medical training of the graduate but also granted him the “license” to practice medicine. For the doctorate, at least an additional year of study was required, but this had to be done in Madrid. Only one university was allowed to confer the doctorate degree, the University of Madrid, for which reason it was commonly referred to as the Universidad Central de Madrid. In the civic community, however, even the Licenciado in Medicine was addressed as doctor, which title being familiar to the public mind was more often applied to medicine than to the other fields of knowledge.

Shortly, after his graduation, Dr. Calderon was appointed municipal physician in Calbayog, Samar. From there he was transferred to Carigara and Ormoc in the province of Leyte. His few years there gave him first-hand knowledge of the high incidence of deaths from deliveries and aroused in him a lively interest in the field of obstetrics. One of the first medical studies he conducted was in that specialization. Those earlier contributions, however, were mostly clinical observations and expositions of obstetrical problems met in the course of his practice. To that period, for instance, belongs his report, “Tropical obstetrical problems”, in which he discussed at some length the local
superstitions and customs connected with pregnancies and deliveries. In another study, Obstetrics in the Philippines Islands, he analyzed the conditions surrounding obstetrical practices among the poorer classes in Manila and in other parts of the archipelago. He likewise presented several of his own personal observations and experiences.

With the years his publications directed to the medical field consisted of the fruits of his growing experiences in diagnosis and therapy. This was particularly true in his discussion of problems related to abnormal deliveries, uterine prelapse, uterine rupture, puerperal infection, eclampsia, caesarean section, forceps application, premature separation and retention of the placenta, placenta previa and post-partum hemorrhage.

After an absence of some eight years, Calderon returned to Manila where he practiced his profession. In 1900 owing to his quest for newer knowledge he set sail for Europe. He stayed in Paris for two years studying under the renowned French obstetrician, Dr. Tamier. It was from the latter that Calderon acquired the technique and dexterity in the use of obstetrical forceps. This newly mastered ability catapulted him to fame on his return to the Islands.

His article on obstetrics in the Philippines, published in 1908 in the encyclopedia Filipina, reveals his mastery of the subject and his familiarity with its historical development in our country. He goes as far back as the times of the missionaries like Father Clain and Father Gregorio Sanz, citing their works, including the embriologia Sagrada of the latter. He pays tribute to the contributions in the field of Philippine obstetrics of such foreigners as the British Fulleron and the Burke brothers; the German Koeniger and Niszen; the Frenchman Permantier, the Portuguese Silva Magallanes; the Spaniards Ginards, Marti, Nelda, Sacristan, Torrejon, as well as the Filipinos Lin, Luna, Miciano, Singian, Valdes, and others.

Those years in Europe also enhanced his gentle frankness, his refined and elegant manners, and his already approachable personality. On his way home he made a stop in Spain and visited the University of Madrid where a good number of Filipinos, who later would contribute significantly to Philippine medical history were then pursuing higher studies in medicine.

On June 10, 1907 the Philippine Medical School was inaugurated. Its creation was due in no small measure to the existence of the Bureau of Science and Health. The school’s first staff was recruited mostly from these two bureaus, and its dean was the Director of the Bureau of Science, Dr. Paul C. Freer, who held both offices concurrently until his death in 1912. That medical institution selected Dr. Calderon as one of its faculty members, others being such well-known Filipino physicians like Jose Albert, Luis Guerrero, Baldomero Roxas, Mariano Vivencio del Rosario, and Gregorio Singian. Then on June 18, 1908 the Philippine Legislature passed Act no. 1870 creating the University of the Philippines. The Philippine Medical School on December 8, 1910 was incorporated to it and became its College of Medicine and Surgery.

American university traditions had no small influence in the organization and initial development of the University of the Philippines. At that time there were few Filipinos brought up in that tradition who could effectively participate in the administration of such a national university. The situation however, was not as acute in the College of Medicine. By then the medical profession was rather well-established in the Islands. A number of successful practitioners had pursued their entire medical training abroad, either in Spain, France, England or Germany. Others, like Dr. Calderon, had part of their medical education in the only local university then in operation, but had rounded out their expertise abroad. Competence was theirs, they simply waited for an opportunity to prove their mettle. That challenge came to Dr. Calderon following his appointments as chief of the department of obstetrics and subsequently of the department of gynecology. In no time, his opinion was also sought in matters concerning the university's
administration and his demonstrated executive abilities won for him the appointments of Vice-Dean of the College of Medicine of the State University, and that of Assistant Director of the Philippine General Hospital.

Dr. Calderon played an important role in the early and successful development of the Philippine General Hospital. Eventually when the College of Medicine of the University of the Philippines had developed sufficiently to a point to warrant the transfer of its administration to Filipino hands, Dr. Calderon was the first person chosen by his superiors to occupy such an honor. This was, nevertheless, no easy task for Dr. Fernando, specially at a time when the ability of the Filipino to administer his own affairs was still in doubts. His wise judgment and firm hand however, soon brought a sense of orderliness and personal satisfaction in the ranks of both the College of Medicine and its subsidiary service institution the Philippine General Hospital. By then, Dr. Calderon had been promoted to the rank of Director of the hospital. During the years that he guided these two differently constituted entities he was able to coordinate their facilities and harmonize their services, thus achieving the double objective of affordable our Filipino youth adequate medical formation and providing the sick with effective medical attention.

Despite busy days spent in medical practice, administrative duties, and personal study, Dr. Calderon never lost his charming spontaneity of character and his ever present sense of humor. As a member of fact, these personal qualities helped him to better understand his neighbors needs, largely through a sensibility for others which an extrovert temperament and an optimistic outlook on life acquires. No one was uncomfortable in his presence. In the course of a conversation he would often break the ice with an appropriate and amusing remark.

As the product of an era when the humanistic studies were given more than passing attention, Don Fernando was fairly at ease with classical literature. These studies helped him deepen his understanding of human nature as his patients came to him for assistance, whether medical, moral or financial, but always in search of warm sympathy towards a person in need. It is no surprise then to hear that his subordinates and the poor were never uneasy in his presence.

He was a born storyteller and a gifted post-prandial speaker. One of his students at the time recalls the following incident.

Dr. Fernando Calderon, first professor of obstetrics and first Filipino director of the Philippine General Hospital had easily the best command of English among the old-timers. This is of course to be understood in a relative sense. He could deliver extemporaneous speeches, although in not-too-grammatically correct English, but with great facility. He could likewise readily summarize any lengthy discussion during the faulty meetings. His talk was almost always interspersed with his well-known phrase, “In such a way.”

During one of his frequent inspections of the hospital premises he came across a group of doctors playing the forbidden game of black-jack in their own quarters. He started asking of each of the culprits, “What is your name and rank? One of them (Dr. Ramon Macasaet) gave his rank as that of Instructor, Dr. Calderon remarked in an amusingly indigent tone, “Ah” In such a way that you are instructing these people to gamble. The young instructor happened to be a mere kibitzer.

He could also wield the pen with ease and grace. His oration, for instance, on the late Manuel S. Guerrero, revealed his command of style and vocabulary. For several years he was also the editor of La Revista Filipina de Medicina y Farmacia, which since 1910 was published monthly by the Colegio Medico-Farmaceutico de Filipinas. It is likewise to his credit that he served as president of this latter scientific organization during three distinct terms.
He used his personal qualities and his medical knowledge and skill to advantage in the face of crises and problems. During a difficult and highly sensitive period when the President of the University of the Philippines had resigned in the midst of a politically charged atmosphere, Dr. Calderon was selected by his peers to act as university president. His obligations during that transition period were performed with great dignity, naturalness, and sound discretion. Better still, that temporary exaltation had no effect on his behavior toward his co-workers. He was still the friendly and approachable Don Fernando.

Dr. Calderon’s interest in the field of gynecology came at a later period in his life, his fifty-sixty year. It was only then that he devoted a great portion of his professional hours to cultivating that branch of medicine. In spite of some weaknesses pardonable in a late starter his technic as a surgeon in obstetrical cases was clean-cut, and reflected his alert eye and skilled hands. He was always ready and eager to learn the latest trends in the field of pelvic surgery. Self-study for him was not only a need, but a welcome means of keeping himself professionally informed. Only with gradually failing eyesight shortly before his retirement did he agree to put aside his surgical gloves for good, and this he did with a heavy heart.

One of his outstanding contributions to modern medicine in the Philippines was his pioneering studies done in collaboration with Dr. Honoria Acosta Sison, who was then the head of the Department of Obstetrics and Gynecology in the College of Medicine of the State University. The investigation entitled “Pelvimetry and cephalometry among Filipino women and new-born babies is a continuation of the preliminary work performed by Dr. Acosta Sison and published under the heading “Pelvimetry and cephalometry among Filipinos. The project involved a detailed analysis of 1,237 cases of the normal Filipino pelvis and helped set up standards of measurements valuable to the obstetrician. The two investigators extended their study to include the determination of the available space in the posterior triangle of the pelvic outlet. This aspect of their research was valuable to the effective diagnosis of delivery in cases where there was shortening of the intertuberal diameter. The results showed that the Filipino pelvis was relatively narrower and deeper than that of the American pelvis.

A part of their study included the determination of the size of the head of the full-term newborn child, the length of labor, the length of the second stage, and the influence of the weight of the baby and its position on the final outcome of parturition. The conclusions derived by them are summarized as follows:

1. The Filipino pelvis is of a different type from either the white American’s or the negro’s. Its average normal measurements are similar to those of the generally contracted pelvis of the Americans.
2. The index of the posterior pelvic plane in cases of contracted intertuberal diameter is important in the determination of the probable outcome of labor.
3. Among Filipinos a contracted pelvis, except in cases of osteomalacia, is rarely an indication of Caesarian section.
4. There is practically no difference in the measurements of the pelvic diameters in multiparae and primiparae.
5. The newborn babies of multiparae are longer and heavier than those of the primiparae.
6. The babies of mothers who stay in the hospital one or more weeks before delivery are heavier than those whose mothers entered the hospital at the time of labor.
7. The male babies are in greater number and are longer and heavier than the female babies.
8. Labor is longer in primiparae than in multiparae.
In 1914 he investigated the value of vaccine as a therapeutic remedy against septicemia among women during childbirth. In his published report he attempted to present an objective case for vaccine therapy and extended his comments to cases involving puerperal infection. From a study of his clinical experiences Dr. Calderon arrived at the following conclusions: 1) The anti-streptococci autogenous one on sale in drug store; 2) The anti-streptococci serum produces at times better effects than the autogenous anti-streptococci vaccine is effective and altogether useless in the treatment of acute puerperal has beneficial and positive effects in sub-acute or chronic forms of puerperal septicemia. It is then a powerful adjuvant in uterine therapy.

It was about this time also that he was putting the finishing touches to a medical survey of the archipelago initiated in 1908. till then such an extensive study had not been made, that is, one that included demographic and sanitary conditions of the entire Philippine archipelago, and the geographic distribution of diseases affecting Filipinos. In this study Dr. Calderon discussed the diseases which at the time influenced. In a significant degree the mortality rate in the Islands, and which could be successfully combated – beriberi, malarial fever, smallpox, leprosy, amoebic and bacillary dysenteries, filaria, typhoid fever, and tuberculosis.

The survey’s questionnaire was sent to a great majority of the physicians located in the provinces and included four topics of interest in the study:

I. Predominant diseases (medical and surgical) in the respondents province.

II. Predominant diseases in the locally, during certain months of the year, and their causes.

III. Local and general causes for the predominance of those diseases in the respondents district.

IV. Applicable treatment in the district to correct such diseases.

Two tables summarizes the data received from 95 provincial physicians. The first one (in answer to topic) showed that the three prevalent diseases in the Philippines at that time were pulmonary tuberculosis, malaria, and dysentery. Next in frequency were beriberi, intestinal parasites, gastroenteritis, bronchitis and bronchopneumonia. Typical diseases in certain parts of the country are also mentioned, like buvas (yaws) in Paranaque, Rizal, and exophtalmic goiter in women in the mountainous district in Jaro, Leyte.

The second table summarize data gathered on topics II. It received the absence, on the whole, of seasonal diseases in various regions of the Philippines, although the same pathological entities which slight variations prevail during the entire year. In Ilocos Sur, Leyte, and Negros Occidental, smallpox, measles, varicella, and gastrointestinal diseases predominated during the hot months from November to January.

Dr. Calderon omitted in his study the answers to topics III and IV since they added no new information on the etiology of known diseases of the Philippines. One weakness pointed out by the author of the survey was the sorry state of vital health statistics during those years. They were both deficient and inaccurate. The returns from some provinces reported no more than two or three diseases. Mindanao and Isabela, for instance, appeared to be afflicted with nothing but malaria. The reason for such a situation was not that health conditions in those provinces were better, but that health conditions in those provinces were better, but that sufficient data could not be obtained in the answers to the questionnaire. This was to some extent, a reflection of the conditions of 80 percent of Philippine municipalities which were operating without qualified physicians who should take care of sanitation in the district. Death certificates were being prepared by the municipal secretary or municipal police who had no knowledge of the real cause of the death of the deceased citizen. This medical study was discussed during the Second Regional Convention of Physicians and Pharmacists held in Manila in 1915.
Dr. Calderon also took an interest in the problem of uterine retroversion and published a paper on its effective correction. This was a preliminary article to another wherein he discussed the advantage of the Alfieri operation over methods then in use as a corrective for a retroverted womb. In this connection, Dr. Calderon studied the internal Alexander operation, a surgical procedure named after the Scottish physician, William Alexander. In his paper he pointed out that in the majority of cases of uterine retroversion this latter operation produced unsuccessful results. This was traced to the inflammation in the abdominal wall and subsequent intestinal obstruction.

Dr. Calderon was an answer to the prayers of many indigent women in need of surgical relief of the uterine prolapse. This was the proverbial poor old woman’s disease,” and Don Fernando often remarked humorously when in the midst of such an operation that, much as he enjoyed it, it did not bring the surgeon a peseta. Yet no patient in need of such an operation was turned back, which was a reflection of his living conviction that medicine was to be valued more in terms of services rendered than of services received. This was one of those principles of medical ethics which he shared, through the classroom, with future generations of physicians.

His contributions as an educator were equally, if not more valuable for it is through living contact with students that a professional transmits his technical knowledge and skills and contributes his share towards the continuance of his vocation. In the classroom Dr. Calderon was among the first Filipino physicians to make facile and practical, much of the pedagogical aspects of obstetrics. During his own days as a medical student obstetrics was given an almost purely theoretical treatment. He did not want the repetition of the embarrassing experience by the younger generation of having to handle their first practical obstetrical case only after graduation.

His sense of values on a point of medical ethics, very pertinent to our days, reveals a little of his moral convictions. In a study of the problem of female sterilization, he spelled out his strong convictions against sterilization for purely economic or social reasons. A woman should not be sterilized except for therapeutic reasons. Among these, he included such cases as a decompensated heart condition; advanced pulmonary tuberculosis; chronic kidney ailments or pernicious anemia; a narrow pelvis, or some other defect that is likely to cause abnormal labor; hyperemesis gravidarum hemorrhage; or puerperal psychoses. He believed that the extirpation of both tubes, (double salpingectomy) when called for, was the best way to effect sure and safe sterilization. He considered that operation to be rather simple and safe, and could be performed under local anesthesia.

As a physician and researcher, Dr. Calderon was always ready to undertake the medical problems of the moment. It was not surprising therefore, to find him dedicating time and energy during his active years to the fight of the dreaded taon disease which at the time was taking a great toll among young Filipinos. His inborn tenacity and sense of dedication made common cause with his technical ability and professional knowledge thus turning him into a dauntless warrior against infantile beriberi. As a member of the Committee of Beriberi he contributed to a clearer knowledge of the causes and factors responsible for the prevalence during those years of beriberi in the Philippines. He likewise contributed to the formulation of measures to reduce its high incidence. The highlights of the report included these conclusions.

1. Beriberi is a prevailing disease in the Philippines. It is on the decline in Manila, but is increasing slightly in the provinces.
2. A correlation exists between local rice production and the growing incidence of beriberi.
3. Beriberi recurs during the months of October, November, December and January.
4. Beriberi is widely distributed in the archipelago, but there is a wide variation in the mortality rates.

5. Rice varieties which on inspection and after straining with gram’s iodine solution are found to contain 50% or more of the external layer do not produce polyneuritis when fed to pigeons.

6. The selection of rice varieties which on inspection straining possess this minimum of 50% of the external layers may be a means of preventing beriberi.

7. This method may likewise be employed to classify the various stages of rice during its milling process.

8. Amino nitrogen is useless as a chemical index. A 1.05% ash content is a poor index, while 0.62% of P2O5 content is better, and 1.28% fat is a much better index.

9. For pigeons the following have been found to be effective anti-beriberi rice diets:
   a) Rice with 1.77% P2O5 plus fat, with not more than 0.4% P2O5 content.
   b) Rice with no less than 0.62% P2O5 content, or not less than 0.50% P2O5 but with at least 75% of the external layers.
   c) (These percentages excluded only nine out of 200 rice varieties that afforded protection for pigeons).

10. Dampness and insects are the main factors responsible for rice deterioration on storage.

11. Under-milled rice deteriorates earlier and faster than does over-milled rice.

12. The various trial methods of preparing rice for food affect the P2O5 content and presumably, the vitamin content too.

13. Errors were found in the diagnosis of beriberi both in the city of Manila and in the provinces. There is a wide variation in the errors found in different localities.

14. In spite of such diagnostic errors the fact remains that the problem of beriberi is of capital concern in the Philippines.

15. The laboring and poorer classes are the groups most affected by beriberi.

16. The diet of beriberi families have been found to be varied but quantitatively inadequate.

Dr. Calderon’s concern for Filipino needy children took on concrete form in his efforts to organize milk stations throughout the Islands as a means of improving the health of both infants and their nursing mothers. In the course of a lecture-meeting of the Asociacion Feminista Filipina Dr. Calderon as the guest speaker, broached the idea of a nursery for the underprivileged. His colleague, Dr. Isidro Santos, elaborated further on its possibilities. The project called for a milk station – La Gota de Leche to provide babies with pasteurized milk, and to educate mothers on maternal and infant care, and in this way reduce the high mortality rate of the times. The Asociacion Feminista Filipina was so impressed with the proposal that it joined forces with some physicians in setting up what was to become La Gota de Leche.

Lack of funds however, prevented La Gota de Leche from operating until 1907. At that time an American philanthropist, Dr. David Doherty, was the house guest of Governor and Mrs James F. Smith. When Mrs Helen C. Wilson, a co-organizer of La Gota de Leche acquainted him with the project. Dr. Doherty made an appointment with the First Lady in order to interest her in such a worthy cause. Shortly thereafter, Mrs. Calderon
and her colleagues called on Mrs. Smith and were fortunate to have her lend both her name and her patronage for a fund-raising campaign. This gracious gesture on the part of the wife of the Governor General became the signal for prominent society matrons to contribute to the cause, and thus afforded La Gota de Leche an auspicious beginning. Dr. Doherty himself donated a substantial amount for the purchase of the building and equipment. The organization was originally set up on San Pedro Street (now Evangelista Street) in down-town Manila, until its own building was completed in Lepanto Street.

In February, 1907, La Proteccion de la Infancia was incorporated to carry out the objectives of La Gota de Leche. While the physicians served on the technical committee, the women took care of its administration. The technical committee was composed of Dr. Calderon as president, and Drs. Manuel Guerrero, Quintos, Arevalo, and Nieva among others as board members. The organization has saved countless children from malnutrition and improved the health of Filipino nursing mothers. During the eighth annual meeting of the Philippine Islands Medical Association held in Manila on February 22, 1911, Dr. Calderon reported case studies on conducted by La Gota de Leche. He showed the great improvement and ultimate cure of beriberi affected children after substituting breast feeding with artificial feeding that used sterilized and certified cow’s milk. His clinical studies in that puericulture center strengthened his theory that the best food for babies is that supplied by cow’s milk administered according to norms based on the infants weight.

The year 1936 marked the close of one of the longest and most colorful scientific careers of a Filipino in the service of his government. That year which occasioned his retirement from the University of the Philippines resulted in his appointment by the University of Professor Emeritus of the College of Medicine. In 1947, his own alma mater, through its alumni association of the college of Medicine, presented him in absentia with a silver plaque. He was then the oldest living alumnus of the college of Medicine of the University of Santo Tomas.

On February 7, 1948, six months short of his 82nd birthday Don Fernando Calderon y Roca passed away. His last twelve years had been sightless ones, but his memory remained sharp and clear and his friendliness ever warm. Even during these years of inactivity he acknowledged more than once that all he ever accomplished he could not have carried out without the kind help of his numerous friends. Don Fernando never regarded his successes as his personal triumphs; they were his friends as well.

Forty-five years of active life as a physician is a long stretch of time. Much of this had been devoted to reducing infant and maternal mortality among his countrymen, a mission taxing his professional abilities to the utmost. He attended delivery cases, studies and conducted research in the fields of obstetrics, gynecology and pediatrics, and as the situation demanded, he attempted successfully to solve problems concerning proper food supply for the poor, tuberculosis, the effects of influenza on menstruation, the control of venereal diseases, and the establishment of provincial hospitals. Still he found time to conduct classes as a professor of medicine, supervise the administration of a national general hospital, organize and assist medico-social institutions like La Gota de Leche, and meet his colleagues at gatherings that fostered professional alertness and cheerful conviviality. No one can dismiss lightly his contributions in any one of those activities. Whenever challenges faced him he devoted his energies of the moment to meeting the health of our nation. He strove at all times to make the best use of his skills, and saw to it that these somehow benefited his fellow countrymen.

His life and achievements have left a mark in Philippine medicine. To quote a known colleague of his:

Dr. Calderon left valuable manuscripts which are outstanding contributions to the study of obstetrics, infantile beriberi, tuberculosis and diseases
related to child birth. No man who is familiar with the history of medicine in the Philippines can underestimate the wealth of technical know-how that Dr. Calderon left for us...

The University of the Philippines through its President, extolled his accomplishments after death had given them perspective and luster:

Life has much of the features of a relay race. We hold the baron for a while and great deal depends on our performance at the time. We become the cynosure of all eyes, for the success of the present and the foundations we are able to lay for the future rest heavily on us. We can able to lay for the future rest heavily on us. We can run our course well and bring our commitment to a temporary success, and thus contribute materially to the favorable termination of a venture, or greatly mark the outcome of a project and the future of an institution, our charges. Dr. Calderon worked faithfully and ran his course creditably. We are happy inheritors of his labors made lighter by his efficient performance of the tasks when it was his opportunity to carry them on.

Notes

1. Obstetrics is that branch of medicine and surgery concerned with pregnancy and labor.
2. Hilot is the Tagalog word for midwife, who sometimes was assisted by the salag.
3. Asuang was the local equivalent to the European vampire. It was believed to suck the blood of humans during their sleep.
4. Sometimes this precaution was reinforced by smearing the doors and windows with a mixture of garlic and salt. The penetrating smell was believed to drive away the evil spirits.
5. Buyo is the local given to a masticatory made up of the leaves of the Piper betle, Linn (ikmo) together with scraped areca nut, Areca catechu, Linn (bunga) and lime. It is used in the Philippines and the Indo-Malayan and Polynesian regions. The chewing mixture is regarded as a preservative of the teeth, and a prophylactic against certain stomach disorders. It is also considered among our people to be a tonic and general stimulant.


6. Primipara is the woman who has born only one child or is parturient for the first time. Multiparae, on the other hand, is the woman who has born two or more children or is parturient the second time.


7. In a study for instance, that he conducted in the city of Manila he found that within a given period of time, only 1682 out of 8685 (19%) delivery cases were carried out under medical supervision. He was a strong advocate of measures to discourage non-medically trained personnel from assisting at deliveries. Fernando Calderon, (La) Obstetricia en la Cuidad de Manila” Revista Filipina de Medicina y Farmacia, 1 (Aug. 1910)

9. See Department of Health, Annual Reports. (Manila: Bureau of Printing.)

10. As far as could be ascertained from his living relatives Don Fernando Calderon did to receive an honorary doctorate during his lifetime. Neither for documents allude to it.

11. Botany, zoology, chemistry and physics were the main subjects in the year of Ampliacacion. During the five years of medicine proper the candidate for the degree studied the basic medical sciences during the first two years, and clinical studies the remaining three. Basic medical subjects included anatomy, pathology, bacteriology, and physiology. They were mostly theoretical in presentation (recitation-lecture method) with some demonstration periods. Clinical subjects familiarized the student with Patologia Intena (General Medicine, physical and clinical diagnosis), general surgery, obstetrics, gynecology, pediatrics and therapeutics. Up to 1927 the Faculty of medicine and Surgery was located.

12. The year 1877 saw the first class of medical students graduate from the Faculty of Medicine of the University of Santo Tomas. It was, however, only some years after the American occupation that university’s medical curriculum was revised so that all graduates in medicine were awarded the doctorate degree.

Up to the early years of our century medical education both in the Philippines and abroad was not as scientifically slanted as it is today. To quote Dr. Antonio G. Sison, a noted Filipino physician. It can be said that the early graduates of Santo Tomas University knew more about the art than the science of medicine. I recall my student days of medicine in the United States, in the early years of the 20th century. The type of medical education, there, in many schools of medicine, was quite deficient also in the basic medical sciences, and even in the clinical branches.


15. Dr. Calderon noticed, for instance, during his years of practice in Samar and Leyte and rather frequent recourse to post-mortem caesarean sections. He believes that practice to be a vestige of Spanish times, when the parish priest requested the mediquillo or vacunadorcillo of the town to perform the operation whenever the pregnant woman had died before full term, but there was still a probability of baptizing the living foetus.
16. Uterine prolapse is the falling down of the uterus from its normal position, due to lack of support, usually secondary to weakness of its retaining ligaments or surrounding muscles.

17. Puerperal infection is that infection connected with or resulting from childbirth. Its infectious nature was first realized in the middle of 19th century. The etiologic agent is usually the hemolytic streptococcus. Blood stream invasion (septicemia) is common.

18. Eclampsia is an acute nervous affection attended by convulsions with loss of consciousness occurring chiefly among children and pregnant women.

19. Placenta previa is the abnormal implantation of the placenta over the mouth of the uterus, a dangerous complication of pregnancy causing hemorrhage.


21. The College of medicine and surgery of the University of the Philippines had its obstetrical department in the city of Manila. The first obstetrical clinic was held provisionally in a small room in Saint Paul’s Hospital in the Walled City. It was only four beds and two municipal physicians assigned to attend outside obstetrical cases. See Fernando Calderon, “Tropical obstetrical problems, Philippine Journal of Science, 10B (1915) 371; Dean Conant Worcester (The) Philippines, Past and present, new ed. O (New York; McMillan, 1930) p. 394-395.

22. Western medicine prior to the American regime was introduced into the Philippines mainly through the college of Medicine of the University of Santo Tomas, and the San Juan de Dios Hospital. These centers of medical education and practice produce outstanding physicians in their respective fields, and are a credit of the institutions that trained them. To mention but a few of them; Juan Miciano Calderon, Gregorio Singian, Francisco Varela Calderon, Gregorio Singian, Francisco Varela Calderon, and Gerardo Vasquez in surgery. Ariston Bautista and the Guerreros of two generations, in general medicine; Florentino Herrera, Sr., Diaz Perez, and Ramon Lopez in obstetrics; and Jose Genato, Sr., Enrique Lopez Ramon Papa, Benito Valdez and angel Varela Calderon in other spec. Enrique Lopez, Ramon papa, Benito Valdez, and Angel Varela Calderon in other specializations. See Honoria Acosta-Sison (The) Progress of obstetrics and gynecology in the Philippines, (The) Golden book of the Philippine Medical Association (Manila: 1953), p. 113-133.

23. The College of Medicine and surgery of the University of the Philippines had no separate chair of gynecology until 1922. On the motion of the then Regent Calderon, a department of gynecology was established. Calderon was appointed its head.
24. See Bienvenido M. Gonzalez, Dr. Fernando Calderon in the University of the Philippines, "(The) Journal of the Philippine Medical Association, 24, no. 5 May 1948, p. 265-266.

25. Personal information from Dr. Narciso Cordero, former Head of the Department of Physiology and Biochemistry, college of Medicine, University of the Philippines.


27. This association was born out of the need for a body that, under the existing circumstances would look later after the welfare and interests of the medical and pharmaceutical professions and promote those scientific disciplines. It was founded on June 8, 1899 by a group of Filipino physicians and pharmacists who fought bodily to strengthen and extend the rights and privileges of those professions.

29. Ibid., 9B (1914), 493-497.
30. Pelvimetry is the measurement of the pelvic opening.
31. Cephalometry is the measurement made on the head or skull, specially to ascertain the size of the fetal head in parturition.
32. Pelvimetry is the measurement of the pelvic opening.
Cephalometry is the measurement made on the head or skull, specially to ascertain the size of the fetal head in parturition.
33. Refers to that which is situated between or among tubules.
34. Osteomalacia the softening of the bones, leading to deformities. It is due to faulty nutrition, specially calcium and phosphorus. It affects specially pregnant women.
35. Septicemia is a condition due to pathogenic organisms circulating in the blood stream and causing fever among other symptoms. Most often associated with septicemia are infections caused by such organisms as staphylococci, streptococci, and pneumococci. The genito-urinary tract is one usual portal of entry.
36. Refers to that which is situated between or among tubules.
37. Autogenous vaccine is that prepared from bacteria from a patient's body as an immunizing agent for him. The term autogenous in the phrase is synonymous to self-generated. Stock vaccines on the other hand, are made from culture grown from standard strains.
38. Antonio Cordomiu of the Spanish Medical Corps, published in Madrid the year 1857 a similar study on the medical topography of the Philippine Islands. But it was a tentative survey and did not pretend to be as extensive and intensive as that of Dr. Calderon, Antonio Cordomiu y Nieto, Topografia medica de las Islas Filipinas. (Madrid: Imprenta de Alejandro Gomez Funetenebro 1857), as recorded by W. e. Retana, Aparato bibliografico de la historia general de Filipinos, II (Madrid: 1906) (Manila: 1964), v.2.
39. Fernando Calderon, some data concerning the medical geography of the Philippines, Philippine Journal Science, 9B (1914), 199-218.
40. Filaria are threadlike, slender nematode worms which are parasite when adult in the blood or tissues of vertebrates.
41. Calderon, some data, p. 207.
42. Ibid., p.208.
43. Actas, Memorias y Comunicaciones dela Segunda asamblea de Medicos y Farmaceuticos de Filipinas (Manila: 1915), p. 11.
44. Retroversion refers to the tilting or turning backward of an organ or part; as for instance, the womb.
45. For a detailed account of this surgical procedure consult The Journal of the Philippine Islands medical Association, 14 (1934) 9-12.
   The method was named after Professor Alfieri, gynecologist of the Mangiai clinic in Milan, Italy.
46. It consists in the shortening of the round ligaments of the uterus for displacement of that organ.
47. See the Journal of the Philippine Islands Medical Association, 5 (Nov. 1925), 319-321.
48. Fernando Calderon, When and how should a woman be sterilized, Journal of the Philippine Islands Medical Association, 8 (Feb. 1933) 65-68.
49. Double salpingectomy is the surgical removal of both oviducts.
50. Taon is the local name for beri-beri in breast-fed infants below two years of age.
51. The first committee was appointed upon the suggestion of the Far Eastern Association of Tropical Medicine, by an Administrative order dated November 20, 1923, and signed by the Secretary of Public Instruction. The committee was composed of the following members: Dr. J. Albert, Dr. F. Calderon, Dr. Isabelo Concepcion, Dr. J. Fabella, Dr. P. Gutierrez, Major A.P. Hitchens, Dr. F. O. Santos, and Mr. A.H. Wells (chemist). The chairman was Dr. L. Lopez Rizal. This committee submitted its report on August 4, 1925.
   The second committee was approved by an Administrative Order, dated October 18, 1926, of the Honorable Secretary of Public Instruction. It was composed of the following members, Dr. J. Albert, Dr. P. Calderon, Dr. Concepcion, Dr. J. Fabella, Dr. L. Gomez, Dr. L. Guerrero, Major A.P. Hitchens, Dr. F. O. Santos, Col. E.B. Vedder, and Mr. A.H. Wells. Dr. L. Lopez Rizal was chairman. This committee submitted its report on September of 1928. National Research Council Bulletin., no. 3, (1935), 174.
   In June, 1905 a group of prominent ladies under Mrs. Concepcion Rodriguez organized themselves under that corporate title. Members included Miss Librada Avelino, Miss Maria Arvalo, Mrs. Bonifacia Barreto, Miss Maria Francisco, Miss Carmen de Luna, Miss Clemencia Lopez, Misses Agueda and Jacob Paterno, Miss Sophia Reyes, Miss Trinidad Rizal, Maria de Villamor and Mrs. Paz Natividad Zulueta.
   The first husband of Doña Concepcion was Don Felipe Calderon who died two years after their marriage.
54. The phrase “Gota de Leche” is the translation of its original French, first used by Dr. Dufour with reference to clinics for nursing mothers and their babies. The project received great impetus in France through the initiative and altruistic spirit of one of Calderon’s teachers, Prof. Budia. In 1985 the latter opened such an infant service in Paris as a part of the clinic La Carite. Fernando Calderon, Causes de la mortalidad infantile en Manila y sus remedies,” Manila, 20-24 Nov. 1905; Manuel Artigas y Cuerva, Bibliographia medicofarmaceutica de Filipinas, tomo, 1. Manila: Imp. Manila, 1924), p. 172.


57. See Fernando Calderon. (El) Problema de suministrar alimentacion adecuada a los niños pobres de Filipinas y de educara las madres, “Revista Filipina de Medicina y Farmacia, 1 (Sept. 1910), 185; also his (El) Problema de suministrar alimentacion adecuada a los niños pobres y la instruccion a las Madres, Revista Filipina de Medicina y Farmacia 1 (Nov. 1910) 259-274. the last article was also presented by him at the August 5, 1910 meeting of the Manila Medical Society.

58. Journal of the Philippine Medical Association, 24 (May 1948) 266.

59. Januario Estrada, doctor Calderon as a leader in the medical profession, Journal of the Philippine Medical Association 24, l(May 1948) 263.

60. Bienvenido M. Gonzalez, Dr. Fernando Calderon in the University of the Philippines, Journal of the Philippine Medical Association, 24 (May 1948) 266.

Scientific Contributions

1. 1905 Causas dela mortalidad infantile on Manila y sus remedies. El Renacimiento. 20-24 (November)

2. 1908 (La) Obstetricia en Filipinas. Enciclopedia Filipina, 97, 193.


4. 1910 (La) Obstetricia en la cuidad de Manila, Revista Filipina de Medicina y Farmacia, 1:69-76.

5. (El) Problema de suministrar alimentacion adecuada a los ninos pobres de educara las madres. Revista Filipina de Medicina y Farmacia, 1:185

6. (El) Problema de suministrar alimentacion adecuada a los ninos pobres y la instruccion a las madres. Revista Filipina de Medicina y Farmacia, 1:259-274.

7. 1911 (The) Taon (Infantile beriberi) treated at La Gota de Leche, Manila Medical Society Bulletin. 2: 144-147 cited in Bibliografia Medico-Farmeceutica de Filipina 186.

8. 1914 Some data concerning the medical geography of the Philippine. Journal of Science, 98. 199-218


12. 1933 when and how should a woman be sterilized? Journal of the Philippine Islands Medical Association. 8:65-68.
Isabelo Concepcion

It is not unusual in the lives of men of science that their first love profession-wise is not the flame that blazes their trail to greatness. Isabelo Concepcion is one such example in the history of science in the Philippines. Classroom teaching was his first choice as a career. In 1903 when he left the wide stairwells of the Colegio de San Javier he carried with him the diploma of Maestro Superior. Two years later the classroom was still his first love. By then he had rounded out his career as an educator with a diploma from the Philippine Normal College.

Other fields, however, attracted him. He would teach, yes, but while enlightening the mind and disciplining the will he would also strengthen the body of the Filipino youth. For reasons not ascertainable he decided to take up the study of medicine. Seven years after his graduation as normal school teacher, he received his doctorate in medicine. In 1912 the Philippine Medical college inscribed Isabelo Concepcion in the roster of its graduates as one of its best students. He had maintained such high academic standards that he was a government scholar throughout his medical course.

His academic record soon won for him an appointment as assistant bacteriologist in the Bureau of Science, now the National Institute of Science and Technology. This first position as a public servant lasted only a year. The desire to teach, while tempered during his medical studies, had never really died in him. In 1913, he started once again to wield the chalk and eraser, but this time as an instructor in the Department of Physiology and Pharmacology of the University of the Philippines.

As a teacher, students felt that Concepcion was rather hard to deal with. His well-dressed figure commanded their respect even before he ascended the instructors' rostrum. And once he started his lecture he would not tolerate inattention or misbehavior in class. His students soon learned to respect him, not only for the quality of his prepared lectures, but also because of the discipline and scholarly effort that he expected to them. Almost without his being aware, he transmitted to his charges not professional knowledge alone, but likewise a sense of dedication to scientific work that would characterize him as an educator throughout his professional years. He required hard work, but he himself was the best example. As one of his former laboratory assistants recalls, he was a man who would devote seven days of the week to his scientific studies and tasks. His sense of dedication to his profession was intensified by his sincerely and enthusiasm.

Even during his early years as a professional and an educator his ability as a researcher became manifest in the first scientific reports published by him. His first study on mango rash appeared in one of the issues of the 1914 volume of the Philippine Journal of Science. In it Concepcion reported that : 1) mango consumption during the months of April through July is a responsible actor for
some of the exerts an influence on nursing babies through the milk of their mothers.

Four newly delivered nursing mothers in the obstetrical ward of the Philippine General Hospital were chosen and were fed usually six mangoes daily with their meals. Carefully attention was given to select patients who were free from skin rashes. Daily observations were made on mother and baby, particularly to the development and disappearance of rashes; carefully symptoms were noted carefully. Purgatives were given when necessary to eliminate auto-intoxication as far as possible. Mother and baby slept under mosquito nets to avoid mosquito bites.

In all cases, except one, rashes were produced in mother and child. This exception indicates that individual susceptibility is a factor in the development of the rash. After successive days of feeding, the mother might have acquired some degree of immunity, in which renewal of the mango feeding have failed to produce a second rash. Rashes appeared on the babies whenever mangoes were given to the mothers. The babies, therefore, seem to be more susceptible than are the adults.

That same year he published, in collaboration with R.G. Gibson, a study of the effect of mango on the lymphatic system, and started on his first research in nutrition, investigating the effect of unhusked rice (palay) on nerve degeneration in fowls. This work, done in collaboration with Gibson, was published in a Spanish scientific journal, the Revista Filipina de medicina y farmacia. Chicken fed on an exclusive diet of palay for a period of from two to four months did not develop symptoms of beri-beri, but on autopsy showed degenerative changes in their sciatic nerve. Substitution of unpolished rice for the polished variety may not, therefore offer complete protection against beri-beri. The authors suggest that the addition of other food components to the unpolished rice is essential; to meet the nutritive requirements of the living organisms.

As part of their studies on infantile beri-beri, Gibson and Concepcion investigated the influence of fresh and autoclaved cow’s milk on the development of neuritis in animals. Experiments performed, using dogs and pigs, showed that autoclaving of the milk for two hours at 125ºC did not affect to an appreciable extent either the factors in milk-promoting growth or the nutritive value of the caseinogen. The experiments likewise brought out that antineuritic vitamin is found in milk only in small amounts, and that dogs and pigs fed continually with either fresh or autoclaved milk without diet supplementation to develop some beriberi symptoms. Specifically, three symptoms were observed – degeneration of the peripheral nerves, persistent edema, and aphenia.

These initial studies were followed by a series of research reports on biochemistry as applied to two pressing needs of the times. One was the inadequacy of data on the nutritional value of Philippine foods. Likewise, there was no systematic effort to correlate the health of the Filipino with some fundamental biochemical values like blood sugar content, hemoglobin content, and vitamin values of
blood. These two areas of need were to occupy his time for the rest of his scientific career, but, interrupted by the Occupation years, and relieved by the preparation of papers on similar topics, such as the teaching of nutrition in medical schools, and the urgency of establishing a national Food Commission.

His first five years as a faculty member of the University of the Philippines brought him to the attention of his superiors. The quality of his work, both in the classroom and the laboratory, encouraged them to offer him an opportunity for post-doctoral studies abroad. For two years he observed and studied at the universities of Harvard, Yale, Columbia, and John Hopkins in the United States of America. Shortly after his return he was promoted to the rank of associate professor in the College of Medicine. In 1926, he was appointed full professor of the Department of Physiology and biochemistry, as well as its chairman to succeed Dr. William S. Carter.

Dr. Concepcion was by then aware that any organized nutrition study on a national level would require governmental assistance and the creation of certain agencies.

He was vocal in his support of the Alas Bill and in making the authorities conscious of the importance of nutrition studies for the public welfare. But he did more than oral pleading. He resumed his laboratory studies on nutrition and started planning limited surveys to prove the health conditions of the country.

The first dietary survey under his name was published in the University Alumnus and was based on a study of the eating habits in student dormitories. However, it was eight years later he considered this report mature enough for inclusion in a scientific journal. For this study, eleven dormitories and one male boarding school in the vicinity of the University of the Philippines campus in Manila were surveyed. In these sampled institutions, the students' diet was found to be quantitatively adequate although deficient in calcium and protective foods.

In 1937 he conducted a survey of the diet of the inmates of Welfareville. His method consisted in taking down detailed data for all food purchased daily and taken from the institutions supply room. The weight and cost of all these purchased and requisitioned foods were recorded. Also, all kitchen and table leftovers were collected and weighed. The 975 inmates at Welfareville showed a per capita food intake of 70.68 grams of protein, 73.6 grams of fat, and 470 grams of carbohydrates. The total energy of these amounted to 2,889.88 calories and corresponded to 0.32 of a gram of calcium, 0.89 of phosphorous, and 0.011 of a gram of iron. Dr. Concepcion considered the total caloric value of the Welfareville inmates as adequate, but their protein intake (1.64 grams per kilogram of body weight) was lower than those in three orphanages in India and also deficient in calcium, iron, and the protective foods.

That same year he likewise decided to study the nutrition condition of the personnel, in the armed forces. This survey was conducted at the Manila garrison of the Philippine Constabulary, then stationed at Camp Murphy in Cubao, and
at Gagalangin. The caloric distribution and inorganic content of the foods served to the men were computed from tables presented as part of the report. As in previous surveys Concepcion found this although the calories and distribution as satisfactory, “still” calcium is low and vitamin carriers insufficient. Remedies were suggested, such as additional milk allowance to offset calcium deficiency, a more extensive use of fresh fruits, and more regular serving of fresh vegetables. Among Dr. Concepcion’s concluding remarks regarding the garrisons menu was the observation that too much money is spent for meat and fish and too little for dairy products, leafy vegetables and fruits.

Some years after the Liberation of Manila, he started an extensive study of the food habits of Filipino children in different social levels. The investigation, reported in the Acta Medica Filipina in 1950, was based on returns from questionnaires answered by children of school age in both private and public institutions. The survey showed that generally children in private schools had higher dietary standards and consumption of protective foods compared to students in public schools. The latter were found to consume more vegetables than meat. On the other hand, more children in private than in public schools showed underweight levels as indicated by the Wetzel Grid method. This result as Dr. Concepcion pointed out, showed that money alone is not sufficient to insure adequate diet; education in food values is just as important. Girls of school age revealed that they possessed better food habits than the boys. This could have been due to the instructions in food selection and preparation received either in the home or the school.

Dr. Concepcion continued his research on the somatic development of Filipino school children, collecting for this purpose age, height, and weight measurement of 2,665 public school students and 320 from private schools. The values were assessed according to the Wetzel-Grid method for physical fitness. The results showed minor differences between the two groups with respect to the different channels of development in the Grid.

<table>
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<th>Age (cm)</th>
<th>Height (cm)</th>
<th>Weight Male (Kgs)</th>
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<td>20</td>
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His scientific interest in the field of food chemistry was not limited to its impact on children alone. He was concerned with the health of the Filipino in all ages of physical development. In 1935 he made a study of a problem that has caught
his attention some time before – had the Filipino increased in physical build
between 1915 and 1935? His conclusions, published in a medical journal, stated
that, in general, there was during that period no marked improvement in body
weight and little or none in stature. He also warned against too much emphasis
on school athletes and cancelled that more attention be given to the nutrition
needs of the youth.

Source: Narciso CORDERO et al, (an) Annotated Bibliography Nutrition and

Previous to his study of the Filipino adolescent ans adult, he had investigated in
collaboration with Salcedo and Bulatao, the growth factors of the Filipino infant.
The report showed that male infants weighed more than the females. For both
series, however, weight doubled at the end of each rate of growth was between
0.5 and 1.5 months, while the minimum rate appeared between 8.5 to 9.5
months. On comparing this growth rate of Filipino babies with Europeans he
found this growth to be favorable only for the first three months of life, and to
diminish from then on.

One might expect that a biochemist’s interest in the growth, physical
development, and food habits of a people would necessarily result in the study
of minimum fet allowances and nutritional food values. This was the case with Dr.
Concepcion. As early as 1923 diet allowances for Filipinos had been published.
Shortly before the second world war Concepcion led a team of scientists in
reviewing all the existing knowledge on food requirements for the Filipinos. Their
report advocated standards based for the most part on those adopted by the
League of Nations and approved by National Research Council of the
Philippines on June 23, 1939.

Interest in the nutritional value of Philippine foods attracted his attention early in
his professional life. Mention has been made on some of his studies on mango
and palay. Shortly after his appointment as associate professor at the U.P.
College of Medicine he took up the investigation of the blood sugar content of
Filipinos. This was the second in a series of studies in the field of hematology, the
first being a report in 1916 on blood pressures in Filipino subjects. Some years later
Dr. Concepcion published the results of a hematologic analysis of a sampling of
Filipino normal individuals. Thirteen years were to pass before any other study on
blood chemistry appears under his authorship. In 1940 he reported the results of
an investigation on the hemoglobin content of Filipino children estimated by the
iron method, and in another study he reported the values for albumin and
globulin in the sera of normal and diseases individuals. In 1949 he released he
results of his research on the relationship between and cellcount, hemoglobin,
and iron content. These studies on hemoglobin revealed his interest in a public
health problem in the Philippines, that of iron deficiency anemia.

One of Dr. Concepcion most significant contributions to the health of the Filipino
people was his series of investigations on the vitamin content in the food and
diet of our people. From 1938 to 1940 the issues of the Journal of the Philippine Islands Medical Association carried the reinvestigations were conducted by a team of scientists under the direction of Dr. Concepcion. Three other reports, two on thiamine and one on vitamin A, appear scattered between the years 1950 and 1951.

Dr. Concepcion initial research in vitaminology was an attempt to determine the vitamin C content in Philippine fruits using the 2,6 dichlorophenol-indophenol titration method of Bessey and King. This study revealed high ascorbic acid values in the chico, suha, orange, calamondin, and the Baguio strawberries. But lanzones, cucumbers, bananas, grapes, and apples were found to be poor sources of that vitamin C in fresh when stored, but not when preserved as a concentrated juices. That same year his research on vitamins to include native vegetables. This led to the discovery of rich resources of vitamin C in the alugbati (or libato) coriander, malungay leaves, cabbage, mostasa, and kinchay. More vitamin C was found present in the leaves than in the stems of said vegetables. In the case of cabbage the outer leaves were richer in ascorbic acid than the inner ones. Cooking was found to remove from thirty to seventy-five per cent of the plants vitamin A content.

Using the procedure designed by Sing and Chu, the team of Concepcion and Gargaritano analyzed the extracts from milk and vegetables used by infants as sources of vitamin C. they reported that the ascorbic acid value of human milk was four time higher than in cow's milk, and twice as high than in carabao milk. Moreover, evaporated milk that had been diluted to a composition equivalent to that of cows milk was not as rich in vitamin C as fresh cows milk. Extracts from such fruits as calamansi and dayap were also good sources of the vitamin. The investigators suggested that mothers use malungay, kale, pechay, and cabbage as supplementary foods to milk feeding.

Three studies made that same year of 1939 disclosed the vitamin C content in normal and leprous Filipino subjects. In collaboration with Basa-Camara he reported that blood ascorbic acid value in the umbilical vein of the fetus was 1.6 times greater than that obtained from the mothers' vein. This conclusion was based on a study made of thirty parturient Filipinas. The investigators also pointed out that the increase in vitamin C value was only in the plasma. The ascorbic acid value in the corpuscles was about the same whether taken them from the maternal or fetal blood. However, since this particular study did not fully satisfy Dr. Concepcion's concern for precision he expanded the study to include the vitamin C content in normal Filipino blood. In ninety-eight normal subjects the blood ascorbic acid value was 1,0513 mg/100 in the plasma, and 0.8911 mg/100 in the corpuscles, following the assay method of Pijoan and Eddy. From this analysis he concluded that a level of ascorbic acid in blood plasma of Filipinos between 0.8 and 1.0 mg should be regarded as sufficient, while values below 0.7 mg should be considered as indicative of a pre-ascorbic condition.

The probable relationship between nutrition and leprosy stimulated Dr. C Concepcion to study these two factors in terms of vitamin C content. Ninety-six
lepers from San Lazaro Hospital, taking adequate diets, were examined for blood ascorbic acid.

This blood plasma and corpuscles showed ascorbic acid values of 0.4732 mg/100 and 0.4638 mg/100 respectively. These were lower than in normal subjects. The difference was explained by the authors as due to the disease and the low vitamin C content of the patients diet. They also noted that as the disease progressed there was a corresponding decrease in the vitamin C content in both plasma and corpuscles.

The fact that pregnancy and lactation were the physiological states most susceptible to deficiency diseases, Concepcion and Camara decided to investigate the vitamin C value in pregnant and 44 lactating women, plasma ascorbic acid was found to increase, though not consistently as pregnancy progressed, although that in the corpuscles, remained unchanged. Values for plasma and corpuscles at the time of the delivery and during the first seven days of the puerperium were higher than that for American and European women, probably due to the high vegetable diet of the Filipinos.

The last of Concepcion's investigations on vitamin C was done on Philippine camotes and potatoes. An analysis of their ascorbic acid content, following the method o Bessey and King, revealed that 1) white camote had a slightly higher (17.2 mg%) vitamin C content than the yellow variety (16.16 mg%); 2) potatoes had much lower ascorbic acid value (12.04 mg%) than the camotes. A survey of the vitamin A, B, C, and G content, as well as the chemical composition of camotes and potatoes showed, moreover, higher vitamin A and C as well as caloric values in camotes than in potatoes. The authors, therefore suggested a more extensive use of camotes in the Filipino diet and better dissemination of their A and C vitamin value.

Dr. Concepcion's interest in physiology was reflected in his investigations on the vital capacity's as influenced by tuberculosis of the basal metabolism of Filipinos and the urine analysis of Filipino athletes. It was, however, in the field of nutrition that his impact as a scientist was greatly felt. The more valuable reports, crystallizing the results of his nutrition researches, have already been mentioned. These studies however, did not prevent him from editing and publishing a basic text on Philippine foods, a work which contained his investigations in the field of nutrition. The first edition, published in 1941 was made up of twenty-seven pages of text; the second edition in 1947 included thirty pages. Both of these editions were entitled Composition and Nutritive Values of the Philippine Food Materials in Terms of Eleven Nutriments. The third edition included the English and scientific names, besides the local names of each food. The values for calcium, phosphorus, iron and the vitamins were revised, recalculated and new findings incorporated. The water content was added, as well as the height-weight-age values of Filipinos together with the monthly growth rate of Filipino school children. For the benefit of practicing physicians Dr. Concepcion also included: 1) a list of foods and beverages with their sodium content, valuable in the dietetic treatment of diabetic malitus; 2) a list of local green vegetables and
fruits according to the percentage content of carbohydrates, useful to the busy clinician and student of diet therapy; 3) a list of foods with their fluorine content, of interest to the dentist.

As a scientific writer Dr. Concepcion also contributed regularly to the Nutrition News, and for a time handled the column entitled “Nutrition Abstract”. This sustained interest in the field of nutrition won for Dr. Concepcion international recognition. In 1948 the World Health Organization granted him a traveling fellowship to study the latest trends in the field of nutrition as related to public health. This also afforded him an opportunity to represent the Philippines at the International Congress of Tropical Medicine and Malaria held in Washington, D.C. On his return he resumed his studies at the Public Health Research Laboratories of the Department of Health in Manila. He was by then the chief biochemistry of the organization.

Dr. Concepcion’s professional time was divided between the laboratory and the classroom. During the post-war years he served as professor of medical nutrition, preventive dentistry and dental nutrition at the University of Santo Tomas and other colleges in Manila. As a professor at the Pontifical University he instilled among his students an appreciation for the value of nutrition as a basic course in the medical curriculum. But, he would not witness the fulfillment of his dream to have a course in nutrition included in the medical program in the Philippines. He passed away one year before the Board of medical Examiners decreed its inclusion in the curriculum of medicine.

Dr. Concepcion was fulfilled with several learned societies. He was a former chairman of the Section of Nutrition of the National Research Council and the National Economic Council. He used his influence as a member of these bodies to prevail upon the authorities to set up a national Institute of Nutrition that would, among other activities, coordinate all nutrition work in the archipelago. When the Institute of Nutrition was finally organized he was made a member of the first Nutrition Board. During the last two years of his first Nutrition Board. During the last two years of his life he was also chief biochemist of the Institute of Nutrition. He was a regular member of the Philippine Islands Medical Association, the Colegio Médico Farmaceutico de Filipinas, the Manila Medical Society, the American Medical Association, and the American Medical Physiological Society. He was likewise a charter member and past president of the Philippine Association of Nutrition, member of the Special Committee created by the late Mayor Posadas for the study of milk cooperative in the city of Manila, and member of the Philippine FAC Committee.

Before his death in 1952 Dr. Concepcion was engaged in an extensive study of the thiamine and riboflavin levels in the fasting urine of children and the effect of load doses of this vitamin on their excretion. That same year the Acta Medica Filipina carried his last scientific report, that on blood changes in Filipino pregnant women in relation to food intake. He had by then penned seventy-eight publications spread throughout thirty-eight years, for an average of two a year.
His most productive period were the years 1927 to 1941, and again from 1945 to 1952.

Dr Concepcion was undoubtedly instrumental in making the Filipino aware of the importance of nutrition and nutrition studies in the development of a healthy nation. In addition, he enriched a field of science till then almost untouched in the history of science in the Philippines, and sparked among a number of his students an interest in the field of food biochemistry. In the words of one of them:

Dr Concepcion was a leading biochemist who distinguished himself by his pioneering work in nutrition research. Recognizing in our country the need for an organized program in nutrition, he was one of those responsible for the creation of the Institute of Nutrition Research Center.

Dr. Concepcion was most enthusiastic about the nutrition program in the Philippines, through which he hoped to elevate the health status of our people. He provided opportunities for training so that younger workers could join with him in this crusade. That is how I personally came to know Dr. Concepcion.

Dr Concepcion wielded the new discipline of biochemistry to assess the nutrition status of the Philippines and to suggest lines of future research. He succeeded not only in breaking the ground but in inspiring others to continue where he left off.

At the time of his death in his home in Pasay City, he was sixty five years of age. He left behind his wife, the former Remedios Barredo, and five children – Isabel C. Abdon, Lourdes C. Ramiro, Ramon, Alfredo and Mercedes. His family donated his valuable collection of scientific journals and books in medicine, biochemistry, and nutrition to the Institute of Nutrition, now known as the Food and Nutrition Research Center of the N.I.S.T.

Notes

1. In 1951, this institution on the occasion of its golden jubilee, awarded him a diploma of honor as one of is twelve distinguished alumni.
2. this medical school was eventually fused with the University of the Philippines as its College of Medicine.
3. Pharmacology was made a distinct entity of the U.P. College of Medicine only in 1922, when the Department of Physiology became the Department of Physiology and Biochemistry.
4. Personal information from Mrs. Alicia Bautista, now of the Food and Nutrition Research Center, NIST.
5. Isabelo Concepcion, Observation on mango rash, Philippine Journal of Science, 9B (1914), 509-513.
8. Sciatic nerve is the largest nerve in the body arising from the sacral plexus on each side. Its branches reach into the upper thigh muscles and into the joints, skin and muscles of the leg.

9. Neuritis is the inflammation of the nerves produced by lesions of the nerve roots or the peripheral nerves.

10. Caseinogen is the principal protein of milk which in the presence of rennet is converted into casein.


12. It was Dr. Concepcion who aware of the growing emancipation of biochemistry from physiology, changed the designation of the course of physiological chemistry into that of biochemistry.


20. The Wetzel Grid method determines not only the direction of a child’s development but also the speed of its developmental growth. This it does by analyzing three variables, height, weight, and age and developmental level. Both of these graphs constitute the grid. The height-weight graph reveals the child’s physique and level (size). This level factor is then plotted against age to give the second graph. This level-age relation becomes a joint on a child’s azodrome or schedule of development. (See, N.C. Wetzel, Assessing the physical condition of children, Journal of Pediatrics, 22 (1943) 82-110, 329-361.)


22. Isabelo Concepcion, Have the Filipinos increased in size the last Twenty years, Journal of the Philippine Islands Medical Association, 15 (1936), 195-203. Statistics published in 1966 answer affirmatively to the query posed by Dr. Concepcion twenty years ago. When a comparison is made of the Filipino of 1966 with his counterpart of 1933 the following results are obtained:

1. The male between 20 and 29 years of age weighs 53 kilos and is 2.6 per cent heavier than in 1933.
2. The female within the same age bracket weighs 46 kg. and is 0.6 per cent heavier.


32. Isabelo Concepcion and M.M. Gargaritano, Studies on vitamin C: I. the determination of vitamin C (ascorbic acid) in Philippine fruits by the dye method, Journal of the Philippine Islands Medical Association, 18 (1938), 189-204.
33. Isabelo Concepcion and M.M. Gargaritano, Studies on vitamin C. II. The determination of vitamin C (ascorbic acid) in Philippine vegetables by the dye method, Journal of the Philippine Islands Medical Association, 18 (1938), 481-490.
34. Isabelo Concepcion and M.M. Gargaritano, Studies on vitamin C.: III. The vitamin C content of milk and vegetable extracts available for young infants, Journal of the Philippine Islands Medical Association, 19 (1939) 1-6.
35. Isabelo Concepcion and S. F. Camara, Studies on vitamin C. IV. The ascorbic acid content of maternal and fetal blood, Journal of the Philippine Islands Medical Association, 19 (1939) 139-143.
36. Isabelo Concepcion, P. Paulino and S. Camara, Studies on vitamin C: V. the vitamin C content of normal Filipino blood, Journal of the Philippine Islands Medical Association, 19 (1939) 337-344.
37. Isabelo Concepcion, S. F. Camara, and J. Fulgencio, Studies on vitamin C: VI. The blood ascorbic acid in leprosy, Journal of the Philippine Medical Association, 19 (1939), 733.
38. S. F. Camara and Isabelo Concepcion, Studies on vitamin C: VII. The blood ascorbic acid content in pregnancy and lactation, Journal of the Philippine Medical Association, 20 (1940) 407-410.
39. This refers to that state of a woman at and just after childbirth, more specifically, the period from the delivery of the placenta until the genital passages return to normal (about eight weeks).
40. Vital capacity refers to the amount of air which can be exhaled after maximal inspiration.
41. Basal metabolism refers to the heat produced by a fasting individual at rest 12-15 hours after the last meal. It offers a standard for comparison of metabolism under varying conditions of health and disease.
42. Official organ of the Philippine Association of Nutrition, which is published quarterly. This is now the Philippine Journal of Nutrition.
43. Isabelo Concepcion, C. U. Intengan, and Isabel Concepcion (A) Study of food intake and blood changes during pregnancy among Filipino women, Acta Medica Filipina, 8 (1952) 209-212.
44. Personal information from Dr. Carmen U. Intengan, assistant director of the Food and Nutrition Research Center, in a private communication to the author.

SCIENTIFIC CONTRIBUTIONS


19. (A) Study of the nutritive value and cost of the “Fiambera” luncheon, by Isabelo Concepcion and D.D. Samson, U.P.


26. 1934 Is it desirable from the standpoint of nutrition to increase Filipino sugar consumption? Journal of the Philippine Islands Medical Association. 14: 90-97

27. (The) Physical growth of Filipinos. Bulletin of San Juan de Dios Hospital 8: 11-12


32. Have the Filipinos increased in size in the last twenty years? Journal of the Philippine Islands Medical Association 15:195-203.


37. Standardization of vitamins. Vista Filipina de Medicina y Farmacia. 28:3-10


42. Report of the Chairman of the special committee of the Section of Nutrition, National Research council on the Dietary Standard for Filipinos.


50. 1940 Inadequacies of polished rice and fish diet and recommendations for its improvements in the Philippines. Read before the Sixth Pacific Science Congress, Section of Pacific health and Nutrition, Berkeley, California, July 25, 1939. Proceedings Sixth Pacific Science Congress. 6: 287-298; Acta Medical Filipina 2: 71-78; Revista Filipina de Medicina y Farmacia 30:335.


57. 1941 Composition and nutritive values of Philippine food materials. Manila.
63. 1948 Role of proteins in surgery. Philippine Journal of Surgery. 3:9
64. 1949 Malnutrition as a public health problem in the Philippines and means of correcting it. University of Santo Tomas Journal of Medicine. 4:1.
73. 1951 (The) Thiamine content of beri-beri milk. UST Journal of Medicine. 6, no. 1:1-6
74. Composition of Philippine food materials in terms of eleven nutriments. 3ed rev. and rest.
75. (A) Plea for the creation of a National food Commission. UST Journal of Medicine. 6:24-26.
Paul C. Freer

He lives as an influence rather than a memory among us men whose hands are still busied for a short while with the affairs of here and now. Personality cannot die even if it would.

Dr. Paul Casper Freer was, in a true sense, the pioneer in the overall scientific work of the American era in the Philippines despite the limited output of his scientific investigations in the Philippines. He initiated at the outset of our century a great research institution and guided it for eleven more years to a position of quality with outstanding scientific entities of the world. Through his efforts, too, the Philippine Journal of Science achieved a position of respect and admiration in the international community of scientists. Indeed, Dr. Freer stood out as an effective influence upon the Island’s educational development, specifically in its first academic ventures in the field of Science.

Freer’s family was of Dutch extraction. His father a gentleman of notable scientific attainment was president and co-founder of Rush Medical College in Chicago. His mother, a woman of culture, was both a linguist and a scholar. Within this erudite atmosphere, his early years was nurtured with a deep interest for study and investigation which later was to affect his entire life and returned to Chicago for his high school training. As everyone expected, he enrolled at Rush Medical College although his interest in scientific things was to go beyond the frontiers of medicine and surgery even during those years at Rush. It was there that he discovered the fascinations of Chemistry and all its wonders. But, rather than abandon the medical science in favor of chemistry he decided to take both. After completing medical school at the age of twenty he sailed across the Atlantic and sought admission in the Department of Chemistry of the University of Munich. Germany was then enjoying an enviable reputation as the world’s scientific center, and Munich’s university contributed to that reputation, particularly through its chemical laboratories. One of the outstanding chemists of that university was Herr Doktor Professor Adolf von Baeyer. Of him has been remarked: The late and hesitant development of the German chemical industry was decisively fertilized from Baeyer’s laboratory through the artificial production of the most important plant pigments and the synthesis of the valuable triphenylmethane dyes. Neither Baeyer nor his new pupil, Freer, realized then how much the mentor through chemistry, would influence the growth of science in a group of islands in the far away Pacific Ocean.

When young Dr. Freer first met Professor Baeyer in 1882, the German chemist had entered his seventh year as successor in the chair of chemistry previously held by another luminary, Justus von Lieberg. But it was Baeyer who had in 1877 inaugurated a new type of laboratory that in both size and good planning of facilities represented a definite advance in chemical education. For years to come Baeyers’ new laboratory was to be the model of others in Germany and other countries. We are inclined to believe that it also influenced Freer when years later he had a part in designing the laboratories which would later become the Philippine Bureau of Science.

During the first half of his years at Munich, Baeyer devoted his time to continuing his comprehensive investigations on substances already studied in Berlin and Strasbourg. Key words used in his papers during those first years at Munich were phthaleins, acetylenes, benzene derivatives, and indigo. Indigo, however, had top priority in that list, so that in 1883, when Freer was barely getting familiar with Baeyers’ laboratory activities, his mentor announced that he had by experimental methods finally identified every atom in the molecule of indigo. This was a momentous step in the birth of the German dyestuff industry. It is no surprise then, to learn, that Dr. Freer soon became engrossed in
the study of the synthesis of some of the ring compounds of interest to Baeyer, especially those containing the benzene ring. Of more interest to us however, was the friendship he made with the students of Baeyer's laboratory. One of his classmates was W.H. Perkin, Jr., son of the discoverer of the dyestuff aniline purple, Sir William Henry Perkin. The young British gentleman had come to Baeyer's laboratories from the Royal College of Chemistry in London to perfect his experimental skill in organic chemical research. Soon they were working together in chemical research under the direction of Professor Baeyer. As a matter of fact, Freer's first chemical investigation was done together with young Perkin and published in a German chemical journal in 1886. The next six scientific papers of Freer were likewise all done in collaboration with Perkin.

It is not difficult to see Perkin's friendship as an influence in his resolve to spend those first years of his chemical career in the company of his British colleague. This friendship between young Perkin and Freer continued even after both had left Munich. Perkin went to the University of Manchester where he became the organizer of a school of organic chemistry that was to win world-wide recognition. Freer, after obtaining his second doctorate, this time in chemistry, moved to Owen's College in Manchester, England. It was about this time that Dr. Freer was made to choose between a scientific career in industry or in the academic campus. Although the former offered, as expected, greater financial promise, Freer chose the enrichment of his scientific interests even at the cost of cutting down on his monetary returns.

By 1887 Freer decided to return to the United States and accepted a teaching position at Tuffs University in Massachusetts. In two years time he found a more promising job as Lecturer at the University of Michigan at Ann Arbor. One year later, in 1890 he was promoted to the rank of Professor of Inorganic Chemistry, which meant a chair in both the School of Medicine and the School of Arts. During those years at Michigan, he provided stimulus and motivation for original work among his chemistry students and imparted to them something of the high ideals for scholarship that he had acquired from his German mentors. His teaching hours were interrupted by research on topics that reflect aspects of Baeyer's work in Germany. He then became very much interested in the formation and behavior of the sodium derivatives of various ketones and aldehydes. These investigations did produce important results.

In 1880 doctor Freer contributed an important piece of research which did much to settle the mooted questions of the constitution of aceto-acetic ether, when he found that acetone, a substance containing no methylene group, was capable of forming sodium derivatives, the reaction of which were similar in nearly every respect to those of sodium aceto-ether. This reaction proved to be a general one shown by other ketones as well as acetic aldehyde.

Laboratory research in chemistry played an important role in Freer's life throughout his years as professor in his native country. A large portion of his research papers cover the years from his return to the United States in 1887 until his departure for his new assignment in the Philippine toward the latter part of 1901. During those fourteen years, aside from the investigations done together with Perkins, we find him doing work on acetic esters and ethers on the interaction of metals with nitric acid; on tetrinic acid; on fomic acid; some salts of formamide and on hydrozones. He even published some papers on laboratory techniques and had time to write two textbooks in chemistry.
His laboratory investigations in the Philippines during his first two seems to gravitate mostly towards antiseptics. From here on, most of his published articles were not the results of laboratory investigations but rather descriptive of events and entities or essays in important topics of the times. During the last two years of his life, however, he published a helpful study on Manila copal and a more extensive one on tropical sunlight. His work on Manila copal was included in the international chemical publication Chemical Abstracts and brought out some useful qualities of the almaciga tree. For example, the resin undergoes rapid oxidation on exposure to the air, and in powdered form it gives off carbon dioxide at ordinary temperature, more rapidly when exposed to sunlight. The hardening of the freshly-exuded resin is, however, not due to oxidation.

A study published in 1910 was also the subject of his address as President of the Far Eastern Association of Tropical Medicine during its meeting in Manila on March 5, 1910. In it he summarized the work done in Manila on the quality of tropical sunlight and its effect on microorganisms as well as certain chemical reactions. Among other things he found that aniline undergoes a rapid color change in Manila sunlight, even when the experiment is conducted in vacuo or in the presence of unreactive gases. In general Freer noted that tropical sunlight produces chemical changes which in temperate regions occur either more slowly or none at all.

Two years later he presented a comparative study of the effects of tropical sunlight on various races. The sun's activity was measured by the catalysis of the decomposition of oxalic acid in the presence of uranyl acetate. He found the short rays to be most active as catalysts and the rate of the reaction to increase significantly with the temperature until it reaches 30°C. In both animals and man, as he also reported at the Eighth International Congress of Applied Chemistry, if the actinic rays are injurious in the tropics, they are equally so in clear days elsewhere. While clothing is demonstrably the best for sunlight protection. Death cut short a line of solar investigation, that after two years of work, was beginning to bear fruit. Had he been able to pursue this study further his colleagues believed that he could have contributed significantly to a field that even today has not been widely exploited.

While still with the academic staff of the University of Michigan Dr. Freer, as indicated earlier, published two texts in general chemistry. His Descriptive inorganic general chemistry printed in Boston came out in 1894. A year later his Element of chemistry was out on sale.

His interest in medical research was reflected in articles penned by him a few years after his arrival in the Philippines. The first medical study published by him appeared in 1905 and delved into a topic then in the frontlines of the news in the archipelago – the cholera epidemic. Two years later, two other reports in the field of immunology appeared under his name. After these, all his other publications on medical topics were either editorials in Philippine periodicals or commencement addresses. It is interesting to note that by far, the great majority of his researches were in the field of chemistry, indicative of how strongly chemistry had influenced him and in a way overshadowed his first love, the medical sciences. In the Philippines, however, these two fields of science were to go hand in hand and assist him achieve success as an organizer and administrator of the Bureau of Science. His output of research papers diminished considerably with his arrival in the Philippines, but the spirit of inquiry, the objective appraisal of problems, the meticulous analysis of facts, and the patient perseverance in spite of set-backs remained. All these energizing qualities so vital to laboratory research, Freer redirected towards the solution of problems arising during those challenging and pioneering years in the history of science in the Philippines.
Only July 1, 1901 the United States Congress passed an Act for the establishment of Government Laboratories for the Philippine Islands. The original bill had been authored by Dr. Worcester and passed as Act No. 156 of the Philippine Commission. At the time Dr. Worcester was concurrently holding two offices, one as member of the Second or Taft Commission, and another as Secretary of the Interior in the Philippine Government. It was in this latter capacity that Worcester was much concerned with improving the health conditions in the archipelago which was then suffering from the repeated ravages of infectious diseases. The proposed government laboratories would help fight systematically those health problems. Obviously, the man selected to organize and run such an important national organization would have to possess an unusually broad scientific background, sound judgment, and be endowed with good administrative ability, tact, and common sense. Even before Act 156 had been approved, Worcester had cabled Dr. Freer on June 20, 1901 for his acceptance of the position of superintendent of the Bureau of Government laboratories. Dr. Paul C. Freer, then chairman of the Department of Chemistry of the University of Michigan, accepted the offer. He was not one to turn an opportunity for creative work.

Before coming to the Islands Dr. Freer made special arrangements for an official tour of important laboratories in his own country. He was specially interested in those located in Washington, D.C., New York City, and Woods Hole in Massachusetts. During the tour he was on the lookout, among other things, for opportunities to interest competent researchers for the new Bureau, and to compile a list of those publications needed by the science library he planned to start for the Bureau.

The University of Michigan itself had given Dr. Freer a year's leave of absence, which was extended to another year through the efforts of Governor William H. Taft. By the end of the second year, the University through political pressure, granted Freer a third consecutive year's leave. This was an unprecedented act in the matter of faculty privileges. It is quite clear that Dr. Freer at the time had no intention of permanently relinquishing his academic responsibilities at the University of Michigan.

On September 25, 1901 Dr. Freer set foot on Philippine soil. On that day too, we may say that the Bureau of Government Laboratories was organized. He started work right away and assumed supervision of the five members who until then composed the Municipal Laboratory of Manila – Irving C. Allen, chemist; Mariano Vivencio, assistant chemist; Dr. James W. Jobling, biologist; Eizmendi Braulio, curator; and Julian Bernal, janitor.

After preliminaries had been taken care of Dr. Freer started planning the scientific investigations that would effectively combat the urgent problems of those times – amoebic dysentery, Asiatic cholera, and bubonic plague. All the resources at his command were called into play. This meant utilizing to the utmost the facilities of the biologist laboratory, the chemical laboratory and the science library. Three months later, a director for the biological laboratory of the Bureau in the person of Dr. R. P. Strong arrived. His arrival was the first of a member of American scientists that would pioneer in modern scientific research in the Philippines. In no time too, the laboratories were expanded to include other scientific agencies of the Government. In 1903 the botanical section of the Bureau of Agriculture was absorbed by Freer's Bureau. This meant the transfer under his jurisdiction of Dr. Elmer D. Merrill, who was to conduct fundamental studies in Philippine botany. On June 30 of that same year the Serum Laboratory of the Board of health was also put under Freer's Bureau. When the Bureau of Government
Laboratories was reorganized and expanded into the Bureau of Science in 1905 the Bureau of Mines came under it and became the Division of Mines and the Ethnological Survey division of the Bureau of Education was made its Division of Ethnology. This meant that reputed geologists like Warren D. Smith and H.G. Ferguson, as well as the noted anthropologists D.C. Cole and R.B. Beans became the colleagues of Dr. Freer in the overall research program of the Bureau.

As Superintendent of Laboratories, Dr. Freer planned to pen to visiting scientists the research facilities of his agency. In this way he hoped to attract to his laboratories, interested workers and to be able to offer his own staff the opportunities of learning from the presence of such distinguished investigations. Freer’s program did attain these goals and helped in an effective, though little publicized, way to build up the scientific stature of the Bureau. Part of this effort to enhance the reputation of the laboratories included a gradual Filipinization of its staff as circumstances allowed. This aspect of Freer’s program achieved limited success as early as 1912. By then the Division of Mechanics of the Bureau of Science was completely in the hands of Filipinos, and the majority of the other DIVISIONS COUNTED YOUNG Filipino graduates in no small numbers. Two of them in the division of Chemistry, for instance, Timoteo Dar Juan and Jose del Rosario, on graduating as pharmacists, were invited by Dr. Freer to practice in his laboratories. Later on he recommended them for graduate studies in the United States of America.

Meanwhile, it is pertinent to note that at the end of his third year away from the University of Michigan, Freer received an ultimatum from its Board of Governors. An immediate decision was required. In the words of Secretary Worcester this was how events developed:

I asked him to state to me the conditions under which he would be willing to remain... and he did so. No quorum of the commission was present that day and as immediate action was imperative I stated the facts to four of my colleagues, with a view to obtaining their prior approval. They agreed to accept his offer as they understood it. With a majority of the Commission pledged to its acceptance, I informed him that it would be accepted and he then immediately severed his connection with the University. Later when requested .. official action by the Commission, I found .. that two of the members with whom I had consulted had failed clearly to understand the terms. When the matter came to a vote, my action was not confirmed. I was therefore compelled to inform him that he would not be given the salary for which he had stipulated and that the fault of this unfortunate blunder lay entirely with me for the reason that I had failed to submit his proposition to my colleagues in writing and to secure on the face of the document their written approval.

He cabled to ascertain whether he could withdraw his resignation from the faculty of the University of Michigan, but ..his place had been filled.

It is a bright reflection of Freer’s character that, in spite of the personal injustice the incident had caused him, he remained loyal both to the man responsible for it and to the government agency he was serving. His sense of service rose above personal consideration and feelings.

In 1906, Philippine Commission Act No. 1519 added another laurel to Freer’s laboratories in the form of a new responsibility. The Bureau of Science was made the official custodian of the international fundamental standards of weights and measures.
for the Philippine Islands. Since then it undertook the task of calibrating instruments used by scientific and industrial organizations.

In time the volume of research in the country increased and with it developed the need for sharing its results both here and abroad. The bulletin series started by the Bureau of Science became such as inadequate means of communication and exchange that in January, 1906 the first issue of The Philippine Journal of Science came off the press. It was with no small amount of deserving pride that Dr. Freer as its editor went through this issue which was to become in the many years obtained in Philippine laboratories. Literary ability and sound critical judgment more than equipped Freer for this editorial task. He was nonetheless most conscientious in performing those editorial tasks. Oftentimes he would go over an article twice and thrice before sending it to the printer.

It was also during Freer’s incumbency as Director of the Bureau of Science that other subsidiary scientific publications were started. In 1908 the first of a series of 111 numbers of Press Bulletin were out. The last number appeared in 1926. Mineral Resources of the Philippines came out in 1908 and in the course of fifteen annual issues, which came to a close in 1933, published much important information concerning one aspect of our national patrimony. In 1909 Publications were put out and later renamed Monographs which until 1933 published thirty comprehensive studies in various fields of science.

His diagnostic eye as a physician impressed upon him the need for more qualified medical doctors for the Philippines and the consequent need for another medical school. By 1907, despite the increasing volume of work in the newly created Bureau of Science, freer sought the active cooperation of Dean Worcester and friendly legislators to organize the Philippine Medical School. With its organizations Freer was made dean and professor of chemistry, two position he held until his death. During those years Dr. Freer concurrently held three positions – Director of the Bureau of Science, Dean of the College of Medicine, and Professor of Chemistry. It is important to stress at this point the significance of this triple responsibility in Freer’s life. It is not only reflective of his professional abilities, but also of his influence over the civic and scientific community of those years. Through those positions his dynamic leadership enabled the Philippine Government to draft programs for the advancement of medical education, the improvement of health sciences, and the underscoring of basic sciences in both teaching and research.

In 1909 the Philippine School of Medicine was merged with the University of the Philippines and since then has been known as its College of Medicine and surgery. Here too, Freer introduced his policy of accepting qualified Filipinos into the faculty.

Dr. Freer never wavered from his high ideals of scholarship even when handling the more prosaic duties of administering a medical school. More so when he had a say in educational policies. His deep interest in the field of education as it affected the Philippines was another of his worthy contributions to our academic life. In the second of his commencement addresses at the Philippine Medical School he elaborated on some of the key ideas that guided his activities in the educational field.

The exact training of the graduate of a modern medical board .. will have been without meaning if they have not shown him one fundamental fact, and all of this hard work will have been valueless, if he
has not had introduced within his being the divine spark of independent thought. If he has not this ambition, his future will be first one of stagnation, then of retrogression. It has been one of the chief missions of the Faculty to cultivate this spirit among the students and the members of the latter body themselves must be constantly extending their viewpoints and developing the various branches to which they are devoting their attention. What is true of the individual members holds good of any institution of learning, a condition of dependence on what is already known and a tendency to look backwards into the past is in reality retrogression; and intellectually such an institution must die. The teaching force must itself not only be capable of advancing new thought and of developing new methods, but must utilize these capabilities to the best advantage, continually and restlessly pressing forward to higher ground. Otherwise, the teacher becomes a mere repeater or reciter of textbooks.

Mere teaching will not do; it lacks that peculiar force which render the pupils in after life capable of independent development. Mere study on the part of the expectant graduate will not do also. Continue his scientific growth by observation, thought, study, and reasoning from the facts as he finds those lying in the higher realms of advance beyond.

Dr. Freer’s plea is as relevant and urgent today as during his time. For experience and history attest that this spirit of independent and vigorous thought has to be recalled and inculcated into every generation that comes along before its youth makes it its own.

Dr Freer experienced the frustrations that come with any administrative office, specially the constant struggle for increased appropriations from the government for the growing activities of his Bureau. However, these never dampened his enthusiasm nor prevented him from planning the expansion of his research facilities. In his estimation, manpower was of prime importance if the Bureau was to win for itself a name among the international family of scientists. He succeeded in strengthening his research staff by bringing to the Bureau investigators who were to advance the well-being and prosperity of the Filipino people. Men like Alvin Cox, who succeeded Freer as Superintendent, and other chemists such as Gibbs and West; biologists and medical specialists like Copeland and Walker; bacteriologists like barber and School; ichthyologists like Adams and Seale; geologists like Smith and ornithologists McGregor – all of these men, under the able leadership of Dr. Freer, served their adopted country well.

At fifty-five, death cut short the dynamic and productive life of Dr. Freer. If one were to venture to describe him in one phrase, one could say that Freer’s genius was his ability to cope well and ably discharge a multiplicity of tasks. Perhaps it was his cultivated and mature intellect that brought him success, but even this was greatly enhanced by his dedicated diligence and sustained austerity of spirit. His humility was likewise striking. His very life constituted that continual endeavor to reach that perfect knowledge we still never attain.

A man becomes an influence because he imparts something real, profound, and lasting to those who follow him. Paul Casper Freer was such a man for he left us truth that is lasting, selflessness that is profound, and dedication that is real.
1. In Memoriam: Paul Casper Freer, Philippine Journal of Science, 7 (1921), x.
9. It is of interest to note that Perkin became the inventor of a lasting flameproof finish for cotton known as “non-flame”, In 1912 he left Manchester for Oxford University and established there an even greater school of organic chemistry.
13. Paul c. Freer, (The) Result of the past two years work in the study of tropical sunlight, Philippine Journal of Science, Section B, 7 (1912), 1-28; Also Chemical Abstracts, 6 (1912), 2886.
14. Chemical Abstracts, 6 (1921), 32220.
17. Dr. Dean C. Worcester, was himself a scientist in his own right. Twice he had visited the Philippine during the last two decades of the nineteenth century as
a member of zoological survey teams. In 1899, however, he was called from his position as professor at the University of the Michigan to become a member of the First American Commission, also known after the name of its chairman, Dr. Jacob C. Schuman, president of Cornell University. When this Schuman commission had completed its mission and reported to President McKinley, the later then organized a Second American commission readed by Mr. William Howard Taft. This group was entrusted with the task of undertaking the establishment of a civil government in the Philippines. Mr. Taft was later appointed first civil Governor of the Islands.

21. The volume of manuscripts received for publication were so numerous, that soon after the first issue of supplementary volume XII (1918), the Journal appeared in three sections. With increasing patronage, a fourth section was added in volume V (101) which closed with volume XIII. These were the most productive years of the Bureau in terms of publications in the Journal. After World War II Journal appeared in single monthly issues and was suspended during the later part of World War II, Since 1949, it has come out as a quarterly journal.
23. Ibid.

Scientific Contributions

2. 1887 (The) synthetical formation of closed carbon-chains Part I
19. 1894 Descriptive inorganic general chemistry. Boston.
22. 1895 (The) Elements of chemistry. Boston.


44. 1904 The Spirit of organic chemistry, by Arthur Lachman, with an introduction on the growth of the science of organic chemistry by P.C. Freer, New York.


52. (The) New Philippine medical School established by the government of the Philippine Islands Science. 26:600-602.


56. 1909 Address at the commencement exercises of the Philippine Medical School. Phil. Journ. Sci. Sec. 4: 71-75.


59. Interesting things to see and do in the Philippines.


63. 1911 (The Bureau of Science. Merchants Asso. Rev. 1, no. 5:11-5.


Leon Ma. Guerrero
1853-1935

The first decades of this century marked an interest among the scientific community both here and abroad for Philippine botanical studies. It is in this renaissance of Filipino flora that Dr. Ma. Guerrero made an outstanding contribution to the extent that visitors to Dr. Guerrero's office in the pre-war Bureau of Science could not fail to identify him with Philippine flora.

Dr. Guerrero was a man who possessed eyes that were sharp, determined but friendly, a voice that was both warm and sympathetic, and fingers that were busily engaged in transcribing data captured from the pages of texts or the leaves of collected specimens. All these qualities that he had were in turn directed by a mind that was not only keen and alert, but a will that was set to capture the mysteries of nature's plant world. Oftentimes, Dr. Guerrero would close his eyes; smell again and again, now lightly, now strongly; touch the sample; like a physician palpating in order to penetrate the depths of his subject; then all wrapped up. As if wresting from nature the key to a puzzle, he would clearly but slowly describe the history of the specimen – its classification, botanical description, ecological distribution, and medical values.

Don Leon Ma. Guerrero was indeed a Filipino scientist possessed in no small measure of those qualities that go with the vocation of scientific research. His eyes, nose, fingers, and mind were always on the alert to observe and capture the minutest details of the plant world that were unnoticed by the untrained eye. Once within the range of his senses, he would analyze the object of his attention, whether it be an unknown plant specimen or a challenging theoretical problem. Then he would correlate the data that his memory and his copious notes recalled for him, and offer to his colleagues in the world of botany or pharmacology a new insight into the plant world. All these varied but correlated activities were easily accomplished through his fluency in reading and communication. He was at home in Spanish, English, Italian, Greek, or his native Tagalog. It is no surprise then that Leon ma. Guerrero achieved eminence in those areas which in his lifetime were forging the history of science in the Philippines. He was the first Filipino to obtain the degree of master of Pharmacy. He was the first Filipino forensic chemist to serve with the Real Audience in Manila. He was the first of his race to be elected to full membership to the Spanish Royal Society of natural History and the American Pharmaceutical Association. He Filipino before him had been appointed full professor of botany at the Royal and Pontifical University of Santo Tomas, nor Chairman of the Pharmacy Board of Examiners during the American regime. He was the first Filipino to study intensively our native flora and to classify hundreds of our plant species.

He was born in family of Don Rufino guerrero on January 31, 1853. the family then lived in the residential and out-of down suburb of Ermita, in a lot now bounded by A. Mabini and United nations Avenue. This home sheltered ten children of the Guerrero's who were well-known among neighbors and friends for their rich cultural and intellectual heritage. As a young, Leon enrolled at the Ateneo Municipal de Manila. That city school entrusted to the Jesuits by the Government, awarded him the degree of Bachiller en Aries in 1870. His brilliant academic record and exceptional ability enabled his to go through those years at the Ateneo on academic scholarships. Bent on a career in pharmacy he walked a few blocks in the Walled City of Manila to enroll at the University of Santo Tomas. As a matter of fact, the freshman class in pharmacy for the school-year 1879-1871 was the first that the university offered. In 1876 he received his Bachiller en Farmacia together with
five other graduates in the School of Pharmacy. A year later the Royal University invested Guerrero with the master’s hood and awarded him the first diploma ever issued by that institution, that of Licenciado en Farmacia.

In 1881, at the age of twenty-eight, Leon was appointed pharmacists in the Spanish Corps and assigned to the military pharmacy in Zamboanga City. From there he was promoted to the rank of official pharmacist of the naval hospital at Kañakaw, and a few months later was asked to take charge of the pharmaceutical services of the San Juan de Dios Hospital in Kawit, Cavite. It was during these years that he was given charge of the Botica de Binondo, a position he held until 1896. During the cholera epidemic of 882 he placed the Botica’s pharmaceutical supplies at the disposal of the city health authorities. This gesture was commended by the city officials, who after the epidemic made arrangements that the be financially reimbursed. Management of the drug store offered him, besides an opportunity for public service, one for pharmaceutical investigations. He ventured into the field of industrial pharmacy, manufacturing such products as pepsin, peptone, pancreatin, taka-diatase, and synthetic oil of lemon. This last item resulted from circumstances that challenged his ingenuity. An army officer came in one day with a request for ten kilos of oil was available. But, the order had to be filled. Without much ado he locked himself in his laboratory and some hours after came out with ten kilos of oil of lemon. Two weeks later the officer returned praised the product and requested for ten more kilos. After accepting this new order the officer was told that the oil of lemon of the Botica de Binondo was synthetic product.

When the first World War broke out, the importation of German products started to decline. Among these were dyes used in the textile industry. Dr. Guerrero then took up a study of coloring mater extractable from our own natural resources. For centuries the añi (Tayum) (Indiofera tinctoria L.) and the sibucao or sapang (Caesalpinia sappan, L.) were used by our people as coloring material, but many Philippine trees had not yet been tapped as sources of dye. Dr. Guerrero, in his preliminary report to the Sixth Regional Meeting for Physicians and Pharmacists, described these new sources, but cautioned against the premature development of an industry that may not survive the cut-throat competition of the post-war years. It is also increasing to note here that one of the motives that impelled Dr. Guerrero to utilize our own natural resources in the plant world and attempt to exploit their pharmaceutical and industrial potential was to help curb in some way the flow of our currency abroad through unnecessary importations.

Dr. Guerrero was not a pharmacist and a researcher alone. His heart was at the classroom too. He loved sharing his experiences with others and enkindling in the young something of his enthusiasm for the treasures of science. In 1887 he accepted the position of professor of Botanica descriptive and Determinacion de planas medicinales. Soon after, he introduced at the University of Santo Tomas the laboratory course on plant histology. Eventually this course was incorporated into the Philippine Pharmaceutical curriculum.

When a group of pharmacists organized the Colegio de Farmaceuticos de Filipina in Manila in 1882, Don Leon was chosen member of its governing board. A few months later he was asked to become the editor-in-chief of its official journal, the Revista Farmaceutica de Filipinas. This journal served as the medium for publicizing the scientific studies of its members as well as the forum for upholding the interests of the pharmaceutical profession. The first issue of the Revista appeared on January 3, 1893, but after the eleventh issue dated October, 1894 the journal was discontinued.
Whether from the pharmacy counter or the professor’s chair Dr. Guerrero’s reputation spread out far and wide. In 1889 the government authorities, unwilling to let his abilities go unnoticed, elected him member to the Board of health of the province of Manila. A year earlier he had been appointed official chemical expert for the Real Audiencia de Manila, which was then carrying out the function of our present-day Supreme court. After two years as a forensic chemist Dr. Guerrero tendered his resignation to devote more time to teaching.

Under the deanship of Don Carlos Nolda, the college of Medicine of the University of Santo Tomas presented a memorandum dated April 5, 1893 to the Governor General requesting that representations be made to the proper authorities in Madrid for the creation of the Academia de Medicina y Cirugía de manila. The Academy was approved by a royal decree of August 4, 1896. Because of Dr. Guerrero’s reputation as scientist he was enrolled among the first members of that body.

Meanwhile his own studies in zoology, particularly in the fields of ornithology and lepidopterology, taken up after he had graduated from the university, enabled him to reply these for the public welfare. In August 1896, the Spanish Government appointed Dr. Guerrero zoologist, first class, of the Bureau of Forestry then known as Inspeccion de Montes. It was also during this period that his growing stature as a scientist and a scholar drew the attention of his foreign colleagues. He was the first Filipino to be elected member of the Spanish Royal Society of Natural History’s. Invitations were sent to him also to collaborate in the international journal published in Germany on plant pharmacography.

At this juncture the cry of Balintawak echoed throughout the land. The times were characterized by unrest, change and crises. For Dr. Guerrero this meant giving up or a time the much-cherished challenges of his library and his laboratory. To preserve the freedom of his country and enhance its national integrity he was now ready to sacrifice not only his time and energies but even his professional life as a man of science. For him, anything less would be treason to the motherland and rank ingratitude to one who had afforded him opportunities to further his scientific career.

By presidential decree of September 4, 1898 General Aguinaldo during the Malolos Congress, appointed Dr. Guerrero Representative of three provinces. One of these was Davao. A month later Dr. Emilio appointed him dean and professor of the faculty of pharmacy of the Universidad Literaria de Filipinas. When the office of Inspector General de Montes y Minas in the Republic was in need of a competent director and he was asked to accept the position, he acquiesced. He was also offered the portfolio of Secretary of Agriculture, Industry, and Commerce in the Peace Cabinet headed by don Pedro A. patron. He accepted these various positions in spite of the dangers to his health under such a heavy schedule. The Manila daily, La Patria reported that by them:

Don Leon Guerrero, on of the foremost members of the Consejo Filipino, in spite of his rather weak health, keeps up with his work, just like the other members of that Council. He has revealed a strong determination to make any sacrifice the country may ask of him. An eminent botanist in his own right he still finds time for a long-standing hobby, the study and collection of new plant specimens.

Another contribution of Don Leon’s scientific abilities to his country during those revolutionary times was the Guerrero gunpowder. During the insurrection against the Americans, the troops of General Aguinaldo often experienced a shortage of
gunpowder. Appraised of the problem, Dr. Guerrero organized search parties to collect certain plants rich in phosphorus. One of his sons, Alfredo, who was then a teen-ager, recalls that in carrying out his order he and the others scout the fields of Luzon in search of talbok, ipil-ipil, and spinach (kolitis or halon). The troops would then make a powder of the stalks and mix this with salt-peter.

Don Leon's subdued but dynamic patriotism went a step further. He organized the staff of the newspaper, La Republica Filipina. As its first editor-in-chief and through its pages he gave voice and substance to the patriotic ambitions of his fellow countrymen. But even in those times of strong and even unbridled emotions, his editorials as well as the tone of his paper, reflected the well-tempered, mature, and objective judgments of Guerrero the scientist. At all times his literary style displayed the sincerity of his convictions without any undue appeal to emotions. That style, formed through the humanistic courses of his college years, was enriched by his wide and varied reading habits. His writings, set in immaculate, appealing, correct and literary Spanish, offer the substance of stimulating ideas which is the result of a harmonious blending of the clear cut, detailed, and objective writing of the scientist, with the strong yet sensitive heart of Guerrero the man.

As member of the Peace Commission he strove to secure for his country the blessings of peace and order. To this period belongs one of his writings which describes the cultural and nationalistic backgrounds of the Filipino. He depicts his as pliable and willing to adapt himself to new situations which he believes are good for his home and his nation. He follows a philosophy of life that is not wholly eastern and therefore finds no difficulty in accepting progressive western ideas. The philosophical and religious ideals of the Filipino forged in the Latin culture of Europe are not for him a crushing burden, but rather a blessed heritage from that chivalrous though misfortune-tried nation that in a spirit of generosity sought to transform its virgin Malayan soul. She nurtured it with humanistic ideals that prepared the Filipino to enter into the stream of unlimited evolution towards progress.

When a short-lived First Republic decided to enter into peace negotiations with the American troops, Don Leon was among the members of the Comision de Filipinas which negotiated on the conditions for peace. With the return to normalcy, he resumed his former life of teaching and research. However, he also found time to participate in local and national civic activities.

During the national elections to the first national legislature, the second district of the province of Bulacan chose him as its Representative. In this capacity he was later appointed President of that Assembly's Committee on Public Instruction, which was then a key office in that legislative body. The chairmanship of that committee entitled him to sit a member of the Board of Regents of the University of the Philippines. Shortly thereafter, he was also made a member of the committees on health, budget and interior of the lower house.

While a member of Congress he authored a bill, presented on December 11, 1907 seeking to have all legislative measures written in Spanish, which at the time was he common language of expression among the cultured classes. However, the bill also provided that translations be made of those measures into English and the native dialects. He likewise gave his support to a bill that sought to have all the works of Dr. Rizal translated into English and all the dialects of the Philippines.
As a member of the Philippine Assembly he strove to counteract what he termed “the Anglo-Saxonization” of the Filipino through an American-type, government-supervised educational system. It was his opinion that such a system would weaken the personality of the Filipino and curtail the spontaneous development of his racial and cultural traits. In his capacity as Chairman of the Legislatures Committee on Public Instruction he saw to it that the Department of Public Instruction appropriate a large sum for the organization and maintenance of a normal and trade school in Manila, as well as an agricultural school in Negros. He felt that the Philippine was then in need of well trained Filipino teachers, and generation of enterprising young men willing to work with their hands as a professional farmers and skilled technicians.

For the more talented and cultured members of the national be organized tow institutions in 1900 the Sociedad Filomatica to promote interest in scientific pursuits, and the Liceo de Manila, an educational institution for higher studies. He became the first president of the Liceo. This today is known as the College of Pharmacy of the Manila Central University. In that institution he also taught a favorite subject of his natural history.

When the first Board of Examiners for Pharmacists was organized in 1903, Dr. Guerrero presided as its chairman. That same year he was also appointed member of the first Philippine Census Office. In 1906 the first Philippine Congress of Agriculture was organized in Manila. As a member of its Board of Governors he conducted a thorough study of the system of weights and measures then in use throughout the archipelago.

A not infrequent remark of Dr. Guerrero was, “I am not a phonograph” when students requested him to repeat some of his lectures. Those who knew him tell us that the statement was intended to inculcate in them the need for alertness in class and for sharpening their ability for discrimination and synthesis. But this curt refusal also betrayed his restless and pioneering spirit. He was always on the look-out for new tracks to follow and new challenges to meet. His was not the beaten path to saunter through, except to discover in it Nature’s still hidden secrets. It was, therefore, welcome news for him to hear in 1921 that he had been appointed chief of the Department of botany of the bureau of Science. This assignment offered him excellent opportunities to conduct surveys on the distribution and types of medicinal plants in the Philippine Archipelago. The next seventeen years of close collaboration with the technical staff of the Bureau of Science enabled him to interest young minds in that type of scientific study; to organize his ever growing collection of botanical and pharmacological data; and to publish scientific papers, mostly in the fields of systematic botany and ecology.

Meantime he continued giving classes at the University of Santo Tomas. These were interrupted by his trip abroad. In 1904 he took part in the St. Louis Exposition (USA) as the chairman of the Philippine delegation. In 1914 he again represented the Philippines at the San Francisco Pacific Exposition. Six years later he participated in the first Pan Pacific Scientific Conference held in Honolulu.

In 1924, his alma mater promoted him to the position of Dean of the Faculty of Pharmacy, succeeding Don Joaquin Gamido. Four years later the deanship passed into the hands of Dr. Eufrasio Dominguez, O.P., but Dr. Guerrero continued his professorial duties in plant histology until his demise.

With the years his reputation among the scientific community at home and abroad grew and he received various tokens of appreciation for his contributions. Aside from those already described, he received appointments as member of the Colegio
Spain honored him with membership to the distinct Real Sociedad Espanola de Historia natural. On August 23, 1914 the scientific organization known as the Ateneo Rizal conferred on Don Leon the degree of Doctor of Pharmacy, honoris causa. In 1921 the University of the Philippines, in recognition of his meritorious scientific degree. The University of Santo Tomas too, acknowledged his exceptional professional accomplishments when it appointed him Professor Emeritus of Pharmacophytology.

In the course of his speech on the occasion of his investiture as Doctor of Pharmacy by the Ateneo Rizal, Sr. Guerrero expressed some of his views about the Filipino as a scientist horizons, and which unfortunately may be nurtured by routine laboratory tasks. According to him such an attitude blunts the power of synthesis of the scientific investigator, which is an ability that should be cultivated with the years. He also believed that limited laboratory facilities should not be a hindrance but rather a spur to the genuine scientist in his efforts to pierce the veil of nature’s secrets. Such material limitations should stimulate the imagination and spirit of inventiveness should stimulate the imagination and spirit of inventiveness enabling one to transform a piece of equipment of limited use into another suited to the exigencies of the moment. This talent was not only characteristics of the European, but of the Filipino scientist as well, for no country had a monopoly of scientific ingenuity. He stoutly disagreed with those who believed that whatever was accomplished in the East would never draw the attention of the scientists of advanced nations. Such an attitude was to him nothing but a type of cowardice to face criticism, deserving or otherwise. In his estimation it was far better to be the object of criticism than to be stupefied by apathy. To be under the fire of criticism was to be impelled by a force that could come to accept as true the gratuitous assertion that only a Caucasian brain was capable of scintillating ideas. It was high time that we realized the fact that the pigment peculiar to our skin did not attain our brain. He ended with the belief that the Filipino scientists may still be called upon to divert to new channels the somewhat cloudy stream of modern research techniques.

Dr. Leon Guerrero was often been referred to as the “Father of Philippine Pharmacy”, perhaps because he was the first among his people to practice this branch of science, and with great distinction at that. But, in the nation’s Hall of Fame he may be hailed more accurately as the Father of Philippine Pharmacophytology. His own alma mater chose this specialization as the fitting description of his scientific achievements, and a look at his main publications does confirm the appropriateness of the term. His natural bent for the world of plants did not stop with the knowledge of their description and distribution. He sought to extract their important principle and make them available for the benefit of humanity. In his long years of collection and study he was able to identify hundreds of Philippine plants and discover a good number of native rare plants and herbs, but always with the intention of extracting their therapeutic values.

His study entitled Medicinal Plants appeared as part of the 1918 Census Report of the Philippine Islands. The work was inter revised and enlarged by Dr. William H. Brown and incorporated in the latter’s publication, Minor Products of the Philippine Forests. This study of Guerrero gives a brief enumeration of the plant species most frequently utilized in this country as household remedies. It lists 174 species. The curative values of these plants were gathered mostly from the mediqutos or herbolarios. Dr. Guerrero with true scientific acumen, did not dismiss as childish the observations of these herb physicians. Instead he made allowance for their very limited grasp of the therapeutic values of those
plants, observing that the medicinal possibilities of those species will become apparent once empiricism gives way to the practice of scientific pharmacology. Other valuable observations which Dr. Guerrero mentions in the course of the twelve introductory pages are: (1) More exhaustive techniques of analytical chemistry are needed before summarily rejecting a specimen as of no medical value. (2) The same plant may possess various names, often identical or similar to those already specifically applied to others of distinct botanical origin. (3) Philippine floral specimens should be carefully compared with original types preserved in national herbaria here and abroad.

His other work, Medicinal uses of Philippine plants, lists 406 medicinal plants indigenous to the Philippines as well as those of foreign species introduced into this country in prehistoric times. Dr. Guerrero identifies the specimen, giving its various popular names, followed by a description of its distribution and the curative values ascribed to it. To illustrate the amount of painstaking detail and accurate recording of data that such a type of research entails, the following is a sample of the entries in Guerrero's Medicine uses of Philippine plants:

**FAMILY GRAMINEAE**

Genus Andropogen

<table>
<thead>
<tr>
<th>Andropogen aciculatus, Retz</th>
<th>Tinlai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local names: Aamor-seco (Spanish Filipino, Tayabas, Bataan) Tinlai (Bataan)</td>
<td></td>
</tr>
<tr>
<td>Uses: The entire plant in decoction is regarded as a diuretic.</td>
<td></td>
</tr>
<tr>
<td>Distribution: Common in Central provinces of Luzon, the islands of Palawan and Mindanao</td>
<td></td>
</tr>
</tbody>
</table>

**FAMILY LILIACEAE**

Genus Alium

<table>
<thead>
<tr>
<th>Alium cepa L</th>
<th>Onion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local names: Aldominises, Sbuyas (Tagalog)</td>
<td></td>
</tr>
<tr>
<td>Uses: The bulbs, cooked and mixed with coconut oil, are used in the form of appointment applied to the abdomen to provoke diuresis.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Allium satiyum, L</th>
<th>Bauang or Garlic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local names: Ajos (Spanish), Bauang (Ilocos Norte and sur, Abra, Benguet, Nueva Ecija, La Union, Zambales, Pangasinan, Tarlac, Pampanga, Bulacan, Cavite, Batangas, Manila, Rizal, Tayabas, Camarines Norte and sur, Albay, Leyte, marinduque, Misamis). Lasona (Cuyo).</td>
<td></td>
</tr>
<tr>
<td>Uses: The bulbs, when applied to the temples in the form of a poultice, are considered to be revulsive in headache. They are used also to mitigate the pain caused by the bite of insects, scorpions, centipedes, and other insects.</td>
<td></td>
</tr>
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</table>

**FAMILY PIPERACEAE**

Genus Pipier

<table>
<thead>
<tr>
<th>Piper betle, L</th>
<th>Buyo or betel pepper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses: The leaves together with the lime and betel nut, constitute a masticatory in general use among the Filipinos, ho consider it a preservative of the</td>
<td></td>
</tr>
</tbody>
</table>
teeth and a prophylactic against certain complaints of the stomach. The leaves when greased with lard or sesame oil, are much used by the Filipinos as a carminative medicine applied to the abdomen of children suffering from gastric disorders.

**FAMILY VERBENACEAE**

**Genus Avincennia**

Fremna odorata, Blanco

Local names: Adyau (Camarines, Gumaras Island), Adiyo (Marinduque), Alagau (La Union, Abra, Bontoc, Pampanga, Zambales, Tarlac, Bulacan, Bataan, Manila, Rizal, Tayabas, laguna, negros), ARgau (Negros) Atinge (Nueva Ecija), Lagan (Cotabato) Lasoi (Cagayan), Tangle (Pampanga).

**Uses:** A decoction of the roots, leaves, flowers and fruits is used as a sudorific and pectoral and fruits is used as a sudorific and pectoral and is said to be carminative. The leaves, with coconut or sesame oil, are applied to the abdomen of children to cure tympanites. The leaves are boiled in water and the water used for bathing babies, and also as a treatment for beriberi. In the latter case, the boiled leaves are applied to the affected part of the patient’s body. The plant is used as a headache cure.

**Distribution:** From Batanes Islands, throughout the provinces of Luzon and southward to Cotabato.

Another study that was highly praised both here and abroad involved plants used as fish poison. In this Dr. Guerrero first describes plants as sources of fish poison and then goes into a detailed study of four native species. He gives their botanical characteristics, their toxic effects on the fish and describes their chemical composition. He closed with an analysis of the toxicity tests conducted on lower animal forms using the isolated toxic factors from these plants.

In perspective, Dr. Leon Ma. Guerrero’s investigations in botany and pharmacology revitalized interest in our country for one item of our natural resources, and traced the main directive of scientific research on Philippine Flora. His undying interest in medicinal plants drew the attention of his colleagues to the pharmacological potential of our lush plant patrimony, although other factors have retarded their exploitation, and therefore resulted in the failure to satisfy the demands of a consumer market. Nevertheless, his pen and his voice were reaching out not only to the generation of his time, but to those who were yet to come. Although by modern standards the number of his scientific papers are few, yet his work on medicinal plants alone assures him a place of honor among Philippine men of science. These papers represent fundamental botanical studies without which further progress in that discipline is difficult to imagine. Also, through his lectures and his personal contacts with students, he has sparked in their restless, curious minds an interest in plant chemistry and stirred their wills to venture into the virgin land of our indigenous flora.

His life-long strong determination to develop his natural bent for the plant world, nurtured by painstaking and preserving years of study, have rewarded him with the laurels of success. But despite this achievements, long before his death, he never had lost qualities that a research scientist shares with a child, that of curiosity and approachability. This sense of wonder does attune the mind of the scientist to a living
contact with the outside world, whether this be that of nature or of intelligent beings. We are not surprised then to hear the following comments from one of his still living students:

I came to know him well. His was a disposition that attracted others to himself for its friendliness, self-effacement and modesty. All this enhanced the respect and reverence others had for him, so beloved by many and admired as few have been.

Don Leon’s grandchildren recall to this day how in his old age he enjoyed going with them to Antipolo, and during the walks by road and fields he would describe to them the shrubs, weeds, and trees they met along the way. And for less strenuous relaxation he would attend a movie session at the Gaiety Theater in the Ermita district. At home he enjoyed the company of his wife, Doña Aurora Dominguez, and his two sons, Alfredo and Cesar. Alfredo eventually became a physician but retained his interest in botany. Cesar followed the call to the priesthood and was promoted to the Episcopal rank and assigned as Auxiliary Bishop of Manila before being put in charge of the diocese of Pampanga.

Don Leon passed away on April 13, 1935 after over half a century of service in the pursuit of his choice. What had began as the curiosity of the child developed in the total dedication of the man of science.

NOTES


2. The June, 1904 issue of the American Journal Mever Brothers Druggist (St. Louis, Missouri) carried a biographical account of our man in which his contributions as a scientist were duly praised. The front cover of that issue displayed his picture.

3. His co-graduates were the Licenciados Señores Fernando Benitez, Roondeo Garcia, Rafael Garcia Ageo, Aniceto Merenguel and Tomas Torres Perona.

4. Leon ma. Guerrero, “Notas preliminaries sobre las materias colorants vegetales de Filipinas facilitadas por la Oficina de Ciencias a petición de la VI Asamblea Regional de Medicos y Farmaceuticos de Filipinas, 1918-1919, 4 (1918) 476-482; Revista Filipina de Medicina y Farmacia, 10 (1919) 149-246.

5. See V. Lorenzo Rodriguez, O.P. “Breve relacion de la vida de den Leon Maria Guerrero,” Anales de la Real Academia de Farmacia (Madrid) no. 3, (1953) 245.

6. The Board’s Director was Don Tomas Torres Perona, a co-graduate of Dr. Guerrero at UST. Other members were Alejandro Albert, Pedro Acebede Tomas Alcantara, Ramon Ampeuro, Ramon Alvarez, Juan Caro y Mora, Bagriel Garcia Ageo, Mariano Garcia Y. Rey, Joaquin Gamido, Vicente Gonzalez, Mariano Orelea, Ulpiano Rodriguez, Vicente Rodriguez Lanuza and Anacleto del Rosario y Sales. The first issue carried a scholarly study of del Rosario entitled “Contribucion al estudio de las esencia del ilang-ilang.

7. Retana, however, believes that its last issue was published by the end of 1896. See W.E. Retana aparato bibliographico dela historia general de Filipinas (Madrid) 1906. Manila: 1964 (photo offset) v. 3. no. 4533.

8. Among the objectives of that academy were: 1) Gather data for the publication of the History of Medicine in the Philippines, as well as a medical bibliography of the archipelago. (2) Publish a work on the medical geography of the Philippines. (3) Collect information to serve as the basis for the history of epidemics, and (4)
9. Ornithology is the branch of zoology that treats of birds. Lepidopterology is the branch of entomology (sciences of insects) that deals with Lepidopters (butterflies and moths).

10. Natural History includes botany, zoology, and geology; while Natural Philosophy covers physics, chemistry and astronomy.

11. Pharmacography is the description of the properties of drugs.

12. These lofty ideals he himself expressed in a speech delivered on September 29, 1899 as Rector of the Universidad Literaria de Filipinas. He then said in part: nada de indeferentismos, nada de frialdades. En este asunto (of helping the motherland in times of antioanl crises) todo el que rehusa es traídor; todo el; que niega es criminal, todo el que destruyo es infame porque 0 y tenganlo todos presente – los cuidadanos, sin excepcion alguna se deben a la Patria en cuerpo y alma, y la Patria que instruye a sus hijos, que los amor y gratitude de esos hijos mismos, y tine derecho a perdieres su proteccion y auxilio cuando la tempestad amece y el peligro se avece “ Excerpt in Journal of the Philippine Pharmaceutical Association, 34 (15 Feb. 1947) 58.

13. Los Compañeros de Aguinaldo, La Patria, January 5, 1900.

14. Dr. Guerrero was able to collect a number of medicinal plants in the Bulacan area and take down notes on their various uses.


The scientific names of those native plants so abundant in our country are given hee: Talbak is the Kelowratia elegans, Presl. Ipil-ipil is Leucaena galuca (linn) Benth; Kolites or Halon is Amaranthus tricolor, Linn.

16. El Filipino es ductile, se adapta sin repugnancia a todas las imposiciones cuando las encueta beneficiosas, porque no es misoneista, sin que pore so deje de pretender tambien, al igual de todo hombre de buen sentido, la conservacion de aquelo que es provechoso, como elemento indispensable para un perfeccionmiente ulterior. Su educacion no esta entre los orientele, que la impidam avanzar por la senda luminosa del progreso. Sus ideas religions y filosoficas han sino benefica hemica de aquella nacion hidalga e infortunda que se encaro generosa de transformer el alma virgin del malayo, infundiendo en ella los sublimes ideales de la humanidad, sin asomo aparente de egoismos que empeque necen al hombre.

17. He did not refuse for instance, his appointment as member of the Board of Trustee charged with the administration of the Colegio de San Jose. Other members of that Board were Trinidad H. Pardo de Tavera, charles B. Greenleaf, Manuel Gomes, and Frank s. Boumes.

18. This society counted among its members prominent individuals such as Don Ignacio Villamor, D. Maximino Paterno, Dr. Mariano V. del Rosario, Don Fernando Guerrero and Dr. Manuel Guerrero.

19. Kost of hs scientific writings were published in the Revista Farmaceutica de Filipinas; Revista Filipina de Medicina y Farmacia; Cronica de Ciencias Medico de Filipinas; the Acta, memorias y comunicacions de la Asemblea Regional de Medicos y Farmaceuticos de Filipinas, the Journal of the Philippine Pharmaceutical Association, and the bulletins of the Bureau of Science.
20. That scientific group, just like the educational center of the Ateneo de Manila, took part of their corporate title from the Greek noun Athaeneum. In ancient Greece this was the name of the temple dedicated to Athena, goddess of wisdom, skills, and warfare. In it met poets, philosophers, and rhetoricians or what today would be the literary and scientific scholars of the community. Later on Hadrian called by that name a school of law, letters, and science which is founded in Rome. In modern times that appellative is also given to any building or hall used as a library or meeting place for scholars, as for instance the Ateneo de Madrid.

21. Pharmacophytology is that branch of botany dealing with the study of drugs as extracted from plants.

22. Nuestra mente se ha hecho por las circunstancias a la creencia de que solo un cerebro causico puede emitir fulguraciones que ofusquen. Es preciso que nos convenzamos de una vez de que el pigmento caracteristico de nuestra raza no mancha nuestro cerebro. Quoted by M. Artigas y Cuerva, Bibliographia Medicofarmacutica de Filipinas, tomo I. (Manila: Imp. Manila, 1924) p. 363-364.


24. Ibid, p. 169
25. Ibid., p. 175
26. Ibid. p. 179
27. Ibid., p. 231.

29. Lo pude conocer bien: sus admirables disposiciones su amabilidad su humildad y retraimiento, todo infundia respeto y reverencia hacia aquel hombre tan querido de odos y admirado como peces. Lorenzo Rodriguez, O.P> Breve relacion de las vida de don Leon Maria Guerrero, Anales de la Real Academia de Farmacia (Madrid) 3 (1953) 251.

SCIENTIFIC CONTRIBUTIONS


4. 1914 (El) Ejercicio de profesiones y el ideal del lucro. Cultura Filipina 4: 1124-1129

5. 1918 Notas preliminares sobre las materias colorantes vegetales de Filipinas facilitadas por la Oficina de Ciencias a petición le la VI Asamblea Regional de Medicos y Farmaceuticos de Filipinas. Actas y Comunicaciones de la Asamblea Regional de Medicos y Farmaceuticos de Filipinas, 1918-1919. 4 476-482; Revista Filipina de Medicina y Farmacia. 10(1919) 156-163.

6. 1921 Discurso de apertura pronunciado por el Presidente de la


Richard Crittendon McGregor
(1871-1936)

In as much as all ornithological work in the Philippines since the American occupation was done under the direction of Mr. McGregor, the description of his office would be tantamount to the enumeration of the activities in the science of Philippine Ornithology.

In spite of the other duties assigned to him and despite lack of assistance, McGregor made a tremendous contribution to the knowledge of Philippine birds, particularly along systematic lines. He built the finest collection of Philippine birds now in existence.

During the past fifteen years I have published in the Philippine Journal of Science more than fifty reports on the Tipulidae of the Philippines and elsewhere in eastern Asia. I regard this series of papers as being unquestionably the most valuable and important single study that I have made and can unhesitatingly had it not been for the friendly interest of my dear friend. The letter from McGregor before me are filled with encouragement and suggestions for the continuance of the work. Constantly, he was striving to make available more material for this study.

Our dear friend has gone but his influence on science in the Philippines must long endure. I wish to place on record this same of deep indebtedness to R.C. McGregor for his helpful cooperation over many years. I shall always regard him as one of the truest friends I have ever had.

These two men of science, one of a Filipino, another an American, agree and are both sincere in their testimony of appreciation of a colleagues' achievements in the field of Philippine ornithology. Here is indeed another of those examples of the dedicated scientist and a trained ornithologist who worked in the quiet of his office and laboratory, yet blazed wider and deeper a trail till then awaiting the courageous patience and keen observation of a lover of birds.

The history of Philippine ornithology goes back to the beginning of the eighteenth century when the collection of Philippine birds by the Moravian Jesuit, Gregory Joseph Camel, supplied the materials for the earliest memoir on exotic birds that has come down to us. For almost two centuries, these islands had been nothing more than a veritable collecting ground for foreign naturalists. Travelers, members of the clergy, and crews of merchant vessels picked up birds here and there and took them to Europe where they were identified and preserved. The novelty of our Philippine birds aroused interest in great European museums, to the extent that they were to organize later on, expeditions to bring more specimens for their own collection. These activities resulted in the early literature on birds. Men like Eydonyx, Jacquinot, Jagor, Kittlitz, Lindsay, and Sonnerat brought Philippine birds to European museums, while ornithologists like Everett, Gray, the Marquis of Tweedale, Martens, Walden Salvadori, and Sharp described them for posterity in their catalogues.

The establishment of the American regime meant a new page in the annals of Philippine birds. The man responsible for this was Professor Dean Worcester. Thrice before 1900 he had visited the Philippines, twice as a naturalist, and once as a member of the Schuman Commission. His familiarity with Philippine conditions prompted his government to appoint him as member of the Taft Commission. That body, also known as the second Philippine commission, was organized by president Mackinley, on March 16, 1900 to hasten the transfer of the government from military to civilian authorities. Judge William H.
Taft was its president and members were Henry C. Ide, Bernard Moses, Luke E. Wright, and Dean C. Worcester.

Mr. Worcester among his varied tasks as member of the Commission was asked to organize a section of ornithology. His natural bend for science helped him achieve this part of his assignment with much enthusiasm. The man selected to organize the work gave promise of fulfilling it well. Richard C. McGregor, who was appointed chief of the ornithological section of the recently set up Philippine government Laboratories.

In spite of other pressing duties and the shortage of technical assistance, McGregor made very significant contributions to the knowledge of Philippine birds. He described birds from all parts of the archipelago and made compilations of nearly all existing literature relating to Philippine ornithology. This fact alone would have been sufficient to enshrine him in our hall of science. Jointly with Mr. Worcester, A Handlist of the birds of the Philippine Islands was published in 1906. Three years later the publication was enlarged with corrections and additions and offered to the reading public under a new title, A manual of Philippine birds. McGregor intended this Manual to fill in the need for a descriptive catalog of Philippine birds. Lists of Philippine birds had been published from time to time, but they contained no descriptive material sufficient for the adequate identification of species, and there was no assurance that these lists were available in large libraries. The Catalogue of Birds, for instance, in the British Museum contains descriptions of most of the known species of birds, and includes very many from our archipelago, but the bulk of its twenty-seven volumes would preclude its use as a field manual, not to mention its rarity and prohibitive cost.

In the first page of his A manual of Philippine birds McGregor indicates that he hopes the work may be a means to stimulate activity and interest in ornithological work throughout the Islands. The text is based on materials obtained from various sources containing about 8,000 bird specimens collected for the Bureau of Science, nearly 200 skins from the United States National Museum, and some small lots from miscellaneous sources. However, about 150 Philippine specimens have remained unidentified and for a few other species no complete description are given for want of available material. This is specially true of shore and water birds, most of which visit the archipelago as migrants and are not obtainable in breeding plumage. To satisfy these deficiencies, McGregor incorporated in his Manual, descriptions from previous works, particularly those from the Catalogue of Birds in the British Museum, the Birds of British Burmah of Oates, and the four volumes on birds in the Fauna of British India.

In the Manual, McGregor describes the birds in the following manner: by their scientific designation, by one of their English names, and also by their more common native designation. The distribution of each species is given by islands, arranged alphabetically, together with the names of the collectors. Distribution outside the Philippines is given only in a generic way. To the descriptions and measurements of the birds McGregor adds information on habits, nests and eggs, abundance, and similar topics. In a good number of instances he includes notes by Boums and Worcester. A sample entry is reproduced below:

252. Loriculus Philippensis (P.L.S. Miller)
   Luzon Colasisi

Psittacus philippensis P.L.S. Muller, Syst. Nat. Suppl. (1776), 80.
Loriculus philippensis SALVADORI, CAT. Birds Brit. Mus. (1891), 20, 524; SHARP, Handlist (1900), 2.36; MCGREGOR AND WORCESTER, Hand-List (1906), 50.
Co-la-si-si, Manila.
Banton (Celestino); Catanduanes (Whitehead); Luzon (Meyer, heriot, Mollendorff, Steere Exp. Boums & Worcester, Whitehead, McGregor); marinduque (Steere Exp.)

**Adult male** - Forehead red, bordered behind by a narrow line of yellow; crown faintly tinged with yellow; a narrow golden orange band or spot on nape. Length. 160; wing, 92; tail, 42; culmen from cere, 15.

**Adult female** - Differs from the male in having the cheeks blue under parts yellowish green with no red breast-patch. Length 152; 93; tail, 45; culmen from cere, 12.

The habits of the Philippine representatives of the genus agree so closely that a description of one species will suffice for all. The eight Philippine species at present known are all peculiar to the group. They are common in the deep forests of the wilder islands, but are most readily observed and easily obtained in the coconut groves near and in the native villages, where they feed on young blossoms and drink the “tuba”. The latter article of diet is the palm juice which the natives obtain by cutting off the blossoms stalks of the coconut trees and fitting a joint of bamboo over the cut ends. The Loriculi are inordinately fond of this juice and many of our specimens were shot from the “Bombons” (bamboo tubers) as they drank it. They are by all odds the commonest cage birds of the islands, and are frequently carried by the natives from place to place. The various native names “colasisi; cucci; culanci; are all attempts to imitate the note. They have the peculiar undulating flight of woodpeckers, and give their shrill whistle at frequent intervals when on the wing. Usually very shy in the woods but exceedingly bold in the coconut groves. Almost never seen in flocks.

Another significant contribution of McGregor in the identification of Philippine birds was his work (An) Introduction to Philippine Birds. It was published in 1940 then years after the manuscripts had been completed. Dr. Canuto G. Manuel, who was responsible for its final publication form, observes in his Preface that, in spite of his extraordinary activity, working even while confined in the hospital up to a few days before his death, much was left unfinished. McGregor starts this book with the statement: when all the known birds of the Philippines are assembled, there will be about one thousand different kinds. It is, likewise, informative to quote here McGregor’s own comment on the use of the words specimen and species which appear so often in his work:

The work “specimen” is a sometimes incorrectly used as if it were equivalent to “species”. All the individuals that naturally live and breed together or that are like enough so that they could do so constitute a species. A specimen is any object that is kept for study: it is a sample of its kind. A specimen is identified when it is found to belong to some species already known. A species is classified when its relation to other species is determined. Two men may agree as to the identification of a specimen and disagree as to the classification of the species that it represents.
To illustrate the meticulous accumulation of material that this work represented, the following is his own descriptions of the maya, the national bird of the Philippines, as contained in the Introduction to Philippine birds.

The commonest Philippine munia, Munia atricapilla mimita, or mayang pula, is a small chestnut and blackish brown bird, with horn-blue bill, legs, and feet. This bird constructs a large spherical nest of grass with a small round hole on one side. Six or more white eggs may be found in a nest. Most of the Philippine munias, or mayas, fly about in flocks in open country, and any of them may be expected to eat more or less palay. However, when there is no palay, they must eat other seeds, many of which are not doubt weed seeds. The chestnut may collects into flocks of a dozen to several hundred individuals and in spite of his small size eats and wastes a lot of palay.

The Java sparrow, Padda oryzivora, commonly known as mayang costa, occurs in several islands but most abundantly in the vicinity of Manila. Its colors are mainly lilac gray ad black, with a large white patch on the side of the head. The bill, the legs, and the feet are pink. In Luzon, at least there are also a red maya, Amandaya, probably introduced, and a green maya, Erythrura, but not much is known about the latter, which became very abundant in Manila during April to July 1935.

Several years ago hundreds of mayas of three or four species, but mostly Munia atricapilla minuta, were daily exposed for sale in Manila markets. Now there are very few.

McGregor’s contribution to our understanding of the Philippine crane flies is acknowledged by such an authority as Alexander:

I would ask to be permitted to write a little concerning the influence of McGregor in the development of our knowledge of the Tipulidae of the Philippines. I have been a constant communication with him for more than dozen years, and during that period have received from him scores of helpful and instructive letters.

About 1924 I began corresponding with McGregor and thenceforth received his fullest cooperation in making the involved tipulidae fauna of the Philippines. In the earlier years while he was still actively engaged in field work connected with his studies, he visited certain of the more remote islands of the Archipelago, as Samar and Palawan, and at these time collected a number of interesting Tipulidae.

As a matter of fact, Alexander dedicated a species of handsome crane fly to McGregor, the Pselliophora McGregor, sp. Nov., as an appreciation of his valuable cooperation in making known the very interesting tipulid fauna of the Philippines.

Many other valuable written materials were accumulated by Mr. McGregor during his years of service in the Philippines, all fundamental studies on Philippine Fauna, bird life. His three articles on Philippine ornithological literature include a complete bibliographical data. Part II consists mainly of papers published by the Marquis of Tweeddale in various journals, including The Ibis, and Proceedings of the Zoological society of London. Although the Marquis was interested mainly in Malayan birds, still his last papers included a very important portion of Philippine ornithological literature. The third part records fifty-three entries, four of them listed under McGregor’s own name.
In retrospect, a cursory look at his other scientific contributions published during his year of service with the Philippine government reveals not only his sustained interest in Philippine birds but his tireless efforts to travel to various places, observe and preserve for posterity data often gathered after exhausting physical effort. His article in 1903 “on birds from Luzon, Mindoro, Masbate, Ticao, Cuyo, Cagayan, Sulu, and Palawan, describes the Chibia cuvensis as a new species, and notes six others are either new to the Philippines or of certain status. He records the following new localities for bird species: Luzon, five species; Mindoro, one species; Culion, three species; Palawan, one species; Cagayan, eleven species; Cuyo, twenty-two species; Masbate, ten species; Ticao, ninety-one species.

In 1904 he described fully for the first time the species *Pericrocotus novus* and recorded interesting features of about forty other species. From Lubang he recorded seventy-three species, forty-five from Cagayancillo and seventy-two from the Benguet Province. That same year another report under his name described seven new species and recorded fourteen as new from the Philippines.

Together with Worcester, McGregor (1906) the valuable Handlist already mentioned before, where 693 species are enumerated with their orders, families, and genera, together with their exact distribution within the Philippine archipelago. His observation of avian fauna in Mindoro were presented in a study which described 110 species, thirteen of them for the first time. This was also his first article in the initial issue of the Philippine Journal of Science and was followed by various “Notes”. One of these describes a bird of doubtful occurrence in the archipelago, which he labels the *Chaetura sp*. In the course of Worcesters visit to the twenty-four miles of coral that is known as Apo Island, five bird species were discovered by they were all of the migratory variety, and none of them gives us any clue to the zoological relationship of Apo. Another island, about half as large as the former, and located north of Tablas, yielded twenty-one bird species during the expedition that lasted from July 23 to August 12, 1905. The island of Tablas however, when studied by McGregor revealed no new species from among the fifty found in the area. The presence of three species proved to him that Banton island had a close relationship with the Luzon-Marinduque group. In the Palawan island he found eighty species, one of which the *Hypotaenidia strata* had not apparently been recorded until then.

Four of the above Notes appear in various issues of the Philippine Journal of Science for 1907, the first of them covering twelve printed pages of which McGregor reports on twenty-nine new species found in Basilan island. Two entries taken from this article, which also illustrate the type of data included in McGregor published Notes, are given below.

**Phapitreron brunneiceps**, Boums & Worcester

This species is very distinct from *P. amethystine*, being smaller and differently colored. A male taken February 28 yields the following measurements: Length, 10.5 inches; wing, 5.32; tail, 3.94; culmen from base, 0.98. (p. 281).

**Ninox japoinca** (Temm. & Schl.)

A male and female taken in Basilan, February 27, are darker than specimens whom Cuyo and Calayan. The following notes indicate the variations in specimens at hand.
Basilan, February, male and female; six dark tail-hands, first and second primaries with no light hands; third and fourth slightly banded.  
Cuyo, August, two males; five tail-bands, and primaries banded.  
Fuga, August, two males; five tail-bands, and primaries strongly banded.  
Calayan, November, male; five tail-bands, and primaries strongly banded; December, male, female and November, female; five tail-bands, first primary with indications of light bands.  
Hondo, Japan; five tail-bands, all primaries weakly spotted.

A one-page describes the Rhabsornis inornata, Grant, a relatively unreported Mindanao species, and gives its location and physical description. The island of Cebu he found to be zoologically the most anomalous island of the Philippine Archipelago and adduces two reasons to support his contention. In the first place although geographically close to Negros and Bohol, the island of Cebu’s nestles bird species are different from those in the former. Moreover, Cebu has bird species peculiar to it, such as the Phapitreron frontalis and the Oriolus assimilis. He observes:

The wonder is not that eight species should have made their way in one direction or the other over 4 miles of sea, but rather that 34 species should have failed to cross, or having crossed, should have failed to established themselves.

McGregor also identifies the 114 species collected from Cebu, twenty four of which were being recorded for the first time. This brought to 149 species the number of birds known to exist up to 1907 in that island.

He describes three species of the monkey-eating eagle (Pithecophaga Jefferyl, Grant) from Mindanao and Luzon and includes their physical measurements. This is the largest and the most interesting of Philippine eagles, which at the time had not been found outside of our archipelago. It measured a meter long, and its wing expanse was about twice as much.

Through the kind efforts of Dr. Leon Ma. Guerrero, McGregor received a perfect specimen of Blyth's wattled lapwing, Microsarcops cinereus (Blyth). It was a representative of a subfamily of birds not previously known to inhabit the archipelago. In the bantayan island of the province of Cebu he found sixty-six species within its forty-seven square miles of land. The presence of the species Ortrotomus cineroeiceps and Iole guimarasensis demonstrates that this island belongs with the central Philippine group (Panay, Negros, Guimaras, masbate, Ticao) and not with Cebu.

An expedition he conducted in 1906 together with Celestino and Canton yielded ninety-nine new species in the Bohol group. In the article reporting the event, McGregor for the sake of completeness, includes all bird species recorded by Tweeddale and Steere. He also advances the theory that Bohol in terms of its bird fauna is related to Samar and Leyte rather then to Cebu.

His studies of birds frequenting the islands north of Luzon resulted in the description of forty species in Batan and thirty-nine in Camiguin island. He spent much time in the description of the Terpsiphone nigra, sprov. And Zestrerops batanis, sp.nov. both of Batan. In the Camiguin and five new species - sphenocercus ilex sp. Nov., Hysiptetes Camiguinnensis, sp.nov. and Zestereps meyleri, sp.nov. As to the Siquijor island birds on the other hand, he was able to describe practically all of them after listing nine new species. These added up a total of ninety-six species from Siquijor and McGregor.
believed there was little probability of this number being greatly increased. A year later, he published the results of his 1907 expedition covering the areas of Cagayan, Agusan, and Butuan in Mindanao. He recorded a total of 106 species, six of them, he believed for the first time.

In 1916 McGregor began a series of five articles published in the course of eleven years on new or noteworthy birds of our archipelago. The first of the series studies a beautiful new species of wood pigeon, and describes six rare species of Philippine birds that are as yet unrecorded. The new species Leuceteron merrilli, sp. Nov. discovered in Polillo Island and in the province of Laguna and Albay McGregor named this species after Dr. Elmer D. Merrill in recognition of his work in phytogeography of the Philippine Islands. The second article describes the monkey-eating eagle found in a new Luzon locally, Nueva Viscaya. It likewise offers comments on several species of interest to the ornithologist. The next report studies eight species, two of them belonging to the subgenus Neoxeocephalus, novum. The fourth of the series is an accumulation of notes on various rare or unusually interesting Philippine bird species. It adds the genus Erythrura to the Philippine list. It is in the course of this article that McGregor makes the observation that may be a challenge to ornithologists even today. Up to 1921 he believed that: Only a few of the smaller islands have been thoroughly explored for birds, and the work on the larger islands have been far from complete. From no locally or island have we a record of observations made throughout an entire year.

The last report of the series gives a description of two new species in the Philippines, Phodillus rivarae, sp. nov., and Prionechillus parsoni, sp.nov. He reports also on twenty-two other species of some interest in ornithology. This article includes some notes for the genera Phodilus I and Prionechilus, and the subgenus Polisornis Phodilus I and Prionechilus, and the subgenus Polisornis novum. He also proposes two new subgeneric names, Polisi, subgen, nov., and Bournsia, subgen, nov.

One of the most extensive reported studies covers an entire issue of the Philippine Journal of Science. Here he presents a variety of interesting observations and arrives at some noteworthy conclusions. To mention but a few: (1) Philippine waters present rather a scarcity of sea birds. (2) Large islands with a diversified topography, extensive highlands, and large virgin forests attract more bird species than the small low islands, of those that have lost their primary forests. Ornithological treasures are, therefore, closely dependent on luxuriant forests. (3) Up till 1920 no thorough zoological exploration had been conducted of the regions of Luzon, Mindoro, and Mindanao. Most of the work available then was the result of a hurried gathering of specimens in limited areas to seek new species and to add data on bird distribution. (4) Ornithological work in any of the islands of the archipelago will result in a great mass of information on the food, nesting habits, the molts, and migration habits of Philippine birds. All these and related data are fundamental in the scientific understanding of the bird life of the region or country.

All this growing information and knowledge of Philippine birds and their environment McGregor gathered at the cost of patience, physical stamina, and courage. It was exhausting indeed to plod through unexplored forests and danger-studded trails. He had to resort to resourcefulness and integrity in his pursuit of species difficult to tract down. Nevertheless, he relished expeditions and field work. One observation he made was on the Palawan hornbill which perches on very high trees, and is extremely wild, that his team was not able to secure any specimen during their expedition in the Palawan island. However, on crossing to the Calamianes islands, north
of Palawan, they found the species to be both common and tame. More than once they found it feeding in low fruit trees just a few feet off the ground.

Francisco Rivera, a taxidermist and collaborator of McGregor from 1919 to 1936, remembers that during their out-of-town trips they would lodge in barrio sites for the night, then climb up hill and mountain sides in search of their prey. On occasion they were overtaken by nightfall and had no choice but to sleep under the trees. They also faced dark and foreboding situations as when a typhoon caught up with their expedition while exploring the far away island of Batanes, north of Luzon. The furious winds pinned them down for a week, forced them to inactivity and reduced their food rations to nothing. Eventually they were forced to thrive on bananas, which fortunately enough, the island offered in abundance. Situations which were sometimes dangerous and uncomfortability. His eating habits, for instance, were so simple, that he would eat any type of food available at the meal table. This simplicity and unaffectedness won for him the admiration and loyalty of his assistants.

Richard Crittendon McGregor cherished Sydney, Australia where he was born on February 24, 1871. The country was at the time in the midst of a gold fever, although twenty years earlier, the gold rush had started in New South Wales and Victoria. At twenty-eighth he obtained his bachelor's degree in arts from the Leland Stanford University. During the years of the Spanish-American War he was deck officer and recorder of the U.S. Coast and Geodetic Survey in Washington D.C. Not may years later his name appeared in the roster of the government's personnel serving in the Philippines. They study of the bird life in the archipelago was to be his main concern and the growing interest of his professional years. Many of these studies which contain his observations and conclusions have been recorded in a number of scientific papers. He even had a book for the young who are interested in bird life.

McGregor's importance to the Philippine government was not to be confirmed to strictly ornithological research. His talent for writing and editorial work was soon recognized and put to good use by his superiors as early as 1908. It was then that he was selected as one the staff members of the Philippine Journal of Science. Eleven years later he was appointed one of its associate editors. When the Department of Agriculture and national Resources was reorganized into the Department of Agriculture and Commerce, McGregor became chief of its division of Publications and managing editor of the Journal. He had this position from 1913 until his demise three years later.

Among those who expressed in writing their appreciation and evaluation of McGregor's editorial abilities was a fellow scientist's and countrymen:

The efficient editing and beautiful publication for the Journal must always be a monument to him, since it stands unexcelled among the scientific journals of the world. How much of the success of this publication has been due to the faithful efforts of our friend, will fully be appreciated by all who have labored with him.

Another fellow worker, a Filipino, still recalls McGregor's generosity with his time and abilities to help young and promising contributors to scientific publication:

In 1936, few months before his death, I used to consult Mr. McGregor in connection with my article on edible fishes. This was to be published in the popular Bulletin, a publication of the Bureau of Science.
McGregor’s very useful literary suggestions have helped me overcome the inevitable mistakes of an inexperienced writer. He believed that an editor’s main concern is with grammatical errors rather than with the writer’s style, and that style is a projection of an individual’s creative ability.

To him I am very grateful for going out of his way to help me. Knowing that I was interested in contributing to scientific publications he used to gather fishery reprints for me.

Once the duties of editor and writer grew on him, McGregor had to forego often the joys of spending long hours in his world of birds. More than one letter written during those years as chief of the division of Publications carried wistful slopes of Mount Banahaw on the hills of the city of Pines. At other times they insinuated his hopes to be able to retire soon to his little property near Manila. But these were all dreams that were never to materialize during his lifetime. Meantime the pressures of work as division chief of zoology and ornithology; as associate editor of the Philippine Journal of Science; as associate editor of the Philippine Journal of Science; as chief of the division of Publications; as writer of a dozen books on birds and bird life, and some thirty-six scientific articles; his ornithological field work; and his classroom duties began to tell on his health. They kept him more and more confined to Manila, even during periods when it would have been better for his health and his morale to have slipped away to Baguio or even the suburbs of Manila.

McGregor’s role as an educator was another phase of his life which also proved his professional competence. In 1909 he was assigned to the Bureau of Education and started giving a course in ornithology at the Baguio of Education and started giving a course in ornithology at the Baguio Teachers’ Assembly. By 1922 he was conducting lectures on Philippine birds for classes in systematic zoology at the University of the Philippines. He also gave lectures on printing and proofreading to students of Library Science in that same institution. To this already busy schedule was added for a time during the middle of 1920, the duties of Acting Director of the Bureau of Science. Dr. Elmer D. Merrill, who was then the director of the Bureau, left on July 15 of that year to attend the Pan-Pacific Scientific Congress in Honolulu as Philippine delegate. At the conclusion of the congress, Dr. Merrill proceeded to United States on a leave of absence. As a result, Richard C. McGregor was designated acting director from July 16 until December 31, 1920.

As acting director, Mr. McGregor was not only an efficient administrator and enthusiastic ornithologist. He inspired his subordinates with kindred spirit and won their devoted loyalty. For ten years (1924-1934) Mr. A. Celestino and Mr. Francisco Rivera undertook the task of collecting crane flies under McGregor’s direction. Between 1928 and 1930 he himself spent various weekends and short vacations with assistants away from the heat of Manila in a little house located at Ube, above Majayjay on the slope of Mount Banahaw in Laguna Province. Several of the most days away from the office at Herrera Street. Some of those specimens have never been taken elsewhere in the succeeding years.

Fellow scientists both here and abroad did not fail to give public recognition to McGregor’s accomplishments. He was a charter member of the national Research council of the Philippines; a fellow of the Ornithological Society of the Copper Ornithological Club; member of the National Association of the Audubon Societies of the Washington Biological Society, the Australian Ornithological Union, and others.
Until he passed away on December 30, 1936 he continued working on his bulletin An Introduction to Philippine Birds. To the very end his pen and his birds kept him at his post. No little of his collections burned into ashes during the battle of Manila eight years after his death. But today, we still possess copies of his fundamental studies on Philippine birds, ad his inquiring and his inquiring interest on that aspect of our national patrimony is alive in those who knew him as a chief, a teacher, or a friend. These still carry with them something of his own same of modest and quiet, together with a preserving and efficient dedication to one field of specialization in the natural sciences, the bird fauna of the Philippine archipelago.

Notes

3. Ornithology is that branch of zoology that deals with the scientific study, structure, and habits of birds.
4. For the guidance of that Commission, President McKinley issued his famous instructions, dated April 7, 1900. According to the instructions, the commission was to exercise legislative functions and also some executive ones, including the right to appoint officials.
9. Frank S. Bourns and Dean C. Worcester prepared for publication a catalog of ornithological specimens collected by the Menage Expection by the Minnesota Academy of Sciences. Financial difficulties prevented the Academy from printing the material, and the use of the manuscript reverted to the authors. They were then used by McGregor for his Manual.
10. Imprint data: manila, Bureau of Printing, 1940.
Our earliest knowledge of Philippine Tipulidae was due to the fragmentary collections of Carl Semper (1859-1864). During our century the intermediate collections of G. Boettcher (1913-1918) and Charles F. Baker (1912-1926) were discussed by Bezzi (1917), Edwards (1926) and by Alexander himself (1922-1927).
40. Richard C. McGregor, New or noteworthy Philippine birds, IV., Philippine Journal of Science, 19 (1921), 691-705
41. Ibid., p. 691.
42. Richard C. McGregor, Some features of the Philippine Ornis, with notes on the vegetation relation to the avifauna, Philippine Journal of Science, 16 (1920), 3361-437.
44. Personal information from Francisco Rivera, McGregor’s assistant at the Bureau of Science.
47. Personal information from Mr. Agustin E. Umali, national Museum ichthyologist.

Scientific Contributions

2. 1901 (A) list of the land birds of Santa Cruz Country, California, Santa Clara, California: (Pacific coast avifauna, No. 2).
4. 1904 Birds from Benguet Province, Luzon, and from the island of Lubang, Mindoro, Cuyo, and Cagayancillo, Manila: Bulletin of the Philippine Museum, No. 3.
7. 1906 Handlist of the birds of the Philippine Islands, by R.C. McGregor
27. 1910 Additional notes on birds from Northern Mindanao, Philippine Islands Journal of Science. 5-D: 197.
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<tr>
<th>Year</th>
<th>Title</th>
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<td>1914</td>
<td>Description of a new species of Prionocrilus from the highlands of Luzon.</td>
<td>Philippine Journal of Science. 9-D 531-533.</td>
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<td>1915</td>
<td>Birds in their economic relation to man.</td>
<td>Manila: Bureau of Science: (Bulletin no. 32).</td>
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<td>1916</td>
<td>New or noteworthy Philippine birds, I.</td>
<td>Philippine Journal of Science, 11-D (1918), 1-19; Ibid., III, PJ S, 18 (1921), 75-83; Ibid., IV, PJ S, 19 (1921), 691-705; Ibid., V, PJ S, 32 (1927), 513-527.</td>
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<td>1920</td>
<td>Index to the genera of birds.</td>
<td>Manila: Bureau of Printing.</td>
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<td>1921</td>
<td>Some features of the Philippine Omis, with notes on the vegetation in relation to the avifauna.</td>
<td>Philippine Journal of Science, 16:361-507.</td>
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<td>1940</td>
<td>Introduction to Philippine birds.</td>
<td>Manila: Bureau of Printing.</td>
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Elmer D. Merrill
(1876-1956)

Rare is the moment of promise or the opportunity for greatness. Often hesitation forefeits the gift of that moment. But this was not so with Elmer Drew Merrill. Not once, but twice this gift came across his path and each time he held on to it with a firm grasp.

In 1901 the Philippine Commission created the Bureau of Agriculture in Manila. The Office of Insular Affairs in Washington, D.C. on behalf of the Commission, turned to the U.S. Department of Agriculture for the recruitment of the needed personnel. The department had at the time an obscure taxonomist, Elmer D. Merrill. He was offered the position of botanist. Merrill declines the offer. On February, 1902 the offer was reiterated. On the spur of the moment, I accepted. Perhaps it was the adventurous call of the Orient, or even the flattery implied in those persistent summons. But regardless of the motivation this decision of young Merrill ushered him into twenty-two years of growing fame and prominence in the Philippine Islands.

It was in the Philippines that this scientific achievements took a shape and value that attracted the attention of colleagues here and abroad. It was in these Islands that this skills in the field of Oriental Botany developed and matured. It was precisely this intimate acquaintance with such a hitherto unexplored field that earned for him, during his lifetime, the reputation of being regarded as the American Linnacus:

Linnaeus played a unique role in the history of Botany and zoological; none of us of the present day can be compared to him, in the literal sense of the word.

Linnaeus role in Botany were:
1. An outstanding knowledge of flowering plants, particularly those offar-off regions.
2. An outstanding originality and ability in methodological and administrative work.
3. A ready desire to assist his fellow workers the world over, in an often astonishingly effective way whenever there was the slightest possibility of doing so. No one among us at present attains those qualities to the same degree and extent as Dr. Merrill.

In the capital of his own native land Elmer Merrill had only made a fair start. There he had done taxonomic work on North American Gramineae under a well-known taxonomist of grasses F. Lamson-Scribner. Merrill’s first steps as a budding author in the Department of Agriculture were relatively unimportant, but they served their purpose for the young assistant in the course of his preparations of manuscripts acquired mastery of methodology in dealing with materials and description, and likewise familiarized himself with the problems of
nomenclature. His future professional plans were however, not yet too clear to him. Although I occupied a botanical position in government service, I was by no means settled as to what my career should be. Yet he would not allow his uncertainty to foster idleness. In the evenings he attended the George Washington University Medical School, where he completed the first year's work and a semester of the second year. Altogether, though, Merrill performed his daily duties more with complacency than with conviction. For indeed with his youth came his share of undecisions, and even distractions since there was too much of interest in life.

This apparent indetermination in the personality of our young man was in all likelihood due in part to inadequate parental guidance. He was born at East Auburn, a suburban area of Auburn, Maine, on October 15, 1876. His immediate ancestors and his parents were people of limited means, whom he candidly referred to as hewers of wood and carriers of water. They were, for the most part, small time farmers of pioneer stock. His immediate ancestors represented English, Scottish and French origins. As a matter of fact, the Merrill family itself was of French Huguenot descent, originally called de Merle. At home little was done to encourage the native inclinations of the children, intellectual or otherwise and limited means confined their ambitions and their outlooks.

For a new England family, they were not particularly religious. I was therefore brought up more or less as a heathen. Perhaps because of my early training, formal religion never appealed to me. At a tender age, the Merrill boys were made to tackle considerable farming chores, but there was always a good amount of banter and games among the five children – Edward Leonard, Linda, Arthur Cummings, Dana t., and Elmer Drew, Grammer school was about the limit of their formal education, but fortunately for the twins, Dana and Elmer, their enterprising spirit coupled with the influence of their village school-mistress enable them to go on to high school. Beyond this, I had no idea of further education, in fact my brother and I felt that it was impossible with our limited leans.

New England, with its vast reservoir of natural life was a stimulating experience for his young exploring mind. Collecting local woods, naming plants, preparing crude botanical specimens; these were his frequent pastime, which fed his intellectual curiosity and invigorated his body as well.

In the words I was attracted at an early date by the shell fungi and assembled a considerable number of the more showy types some years before I even realized that they represented plant forms.

Young Elmer's collection grew with the months and by the time he left Maine for Washington, D.C., in 1899, his private herbarium had ever 2,000 named specimens. This was later presented to the New England Botanical Club.

In the Full of 1894 Merrill enrolled at Maine State College, Orono, an institution that the year of his graduation became the University of Maine. When he
walked down the aisle that June f 1898, his Bachelor of Science degree had the added distinction of being that of class valedictorian. He himself, though confesses that he never quite realized how he had achieved such an honor. As he suggests, he was inclined to underrate his own abilities, a quality that throughout his professional life manifested itself on an unassuming and inpretentious behavior:

I thought there were many more able men in the class than I, I made no striking recode in college, I was not an athlete, being a natural dub at athletic games; I was no leader, being naturally too diffident and having little confidence in my own abilities; was not a grid, giving no more normal attention to my studies and taking considerable part in social activities of one kind or another.

This self-portrait was to change for the better as the years went by. The effervescence of youth and its lack of depth was to give to the solid leaning of the scholar, but not until the spark of enthusiasm had been enkindled in him. This fire enveloped him through contact with a man himself a zealous student of biological sciences:

While in college I was much interested in biological work, specially in botany and particularly in the classification of flowering plants. Here I came in close contact with a rather remarkable teacher, Professor F.L. Harvey, who, like similar men in other small institutions, was charged with teaching botany, zoology, entomology and geology... his enthusiasm for field work and for research was contagious.

His first mentor, Professor Harvey, was responsible for his early exposure to formal botany which then consisted of general botany and another in cryptogamic botany.

It was Harvey who called my attention to lower groups of plants and in my four years of college I not only made collections of fungi; lichens, moses, hepatics, algae and even myxomycetes but named many of them as well.

During his college years he became a charter member of the local chapter of the Phi Kappa Sigma, the Phi Kappa the Phi Beta Kappa was installed at the University of Maine, he was selected one of its alumnus members. Three months after graduation he returned to the University for a nine months assistantship in its Department of natural Science. In lieu of formal graduate work, which at the time was not to be had in that institution, he accomplished considerable work in systematic botany with hardly any form of supervision. As he himself recalled years later:

Systematic botany had always been Elmer’s first choice, but in his own estimation his academic background in that field was rather weak. As a matter of fact, he felt that his master’s degree was hardly an earned one. But university
authorities thought otherwise. One of basis of his year of residence and the quality of work performed during that period and after leaving college (which included his first two years in the Philippines) he was awarded the Master of Science degree in 1904.

Almost a year after receiving his bachelor’s degree, Merrill took the U.S. Civil Service Examination and landed an appointment as Assistant Agrostologist, in the Department of Agriculture. On July 7, 1899 he reported for duty in Washington, D.C. Seven months later he resigned for an overseas commission to the Philippines.

In his own autobiography Merrill recalls that it was a Monday afternoon on February 20, 1902 when he finally gave in to the repeated offer of Mr. F. Lamson-Scribner to accept the position of botanist in the staff of the Philippine Bureau of Agriculture. It was not all due to the lure of the Orient; the two thousand dollars a year did much to bend his will. At one in the afternoon on Washington’s birthday his boat steamed out of New York harbor. Slightly over two months later... we reached Manila and landed in the midst of a very severe epidemic of Asiatic cholera.

Merrill’s first visit to the Bureau of Agriculture brought him to 155 Nozaleda Street in Manila. Rather than direct operations from his desk he decided to go out into the field himself, since his main concern then was to get a bird’s eye view of the field of his future labors. Hardly a month after his arrival he started on his first of many tours of the country. In sixw eekstime he was able to cover a portion of northern Luzon. Then from September to November of that same year he spent at the Botanical Garden in Buitenzorg identifying by comparisons his collected specimens from northern Luzon. This trip to Java he found necessary in his very meager reference library in Manila and the small budget allotment of two hundred and fifty dollars of his first purchase of botanical literature. Moreover, any orders for books would mean a waiting period of half a year.

A few months of investigation revealed a discouraging picture of Philippine flora to the young and enthusiastic botanist. Vidal’s botanical collection gathered from 1876 to 1888 had been destroyed by fire. The same fate had fallen on the botanical library of the Oficina de Inspeccion de Montes. The few but valuable publications that bore the library stamp of the jardín Botánico de manila had disappeared from the shelves. Some years later, Merrill rediscovered some of them in the library of a Manila resident, although every single volume had been stripped of its fly-leaf. The duplicate set of Vidal’s herbarium in the Museo Biblioteca was nowhere to be found in Manila in 1902. Twenty years later, Merrill came across it in a private hoe in Manila. In 1899 the botanical items collected by Fernandez-Villar for Blanco’s third edition of the flora de Filipinas had gone up in smoke. The small amount of botanical material he could find in the Bureau of forestry was mostly uncataloged.

Undaunted, Merrill started a botanical collection in 1902 that took him twenty years to complete. His first specimens was the weeds growing at the backyard of
his office building. Extensive field trips throughout the archipelago, explorations outside the Philippines, and an efficient exchange program enabled him in the course of the years to build up a respectable amount of reference material on Philippine flora. By 1922 he could delight at the sight of 275,000 mounted specimens, two-thirds of which were from the Philippines, and the rest from botanically-related regions. During that period of time he had also been able to send out over half a million duplicates as exchange material to about sixty individuals throughout the world.

Thus at the close of my Philippine career the Bureau of Science herbarium contained representatives of practically all species (of which there were several thousands), isotopes, fragments of types, material critically compared with originals, photographs of types, and sketches. Its general library was admittedly one of the most important single collections of scientific literature in all of Asia and Malaysia its botanical resources ranking with those of the few older botanical institutions in the area men mentioned: Calcutta, Buitenzorg, and Tokyo. Its herbarium ranked next to those of Calcutta and Buitenzorg in size and importance.

Within those years Merrill had built p in Manila an impressive collection of specimens and books on Philippine flora, worthy monuments to his devotion to Philippine botany.

In 1903 Dean C. Worcester, Secretary of the Interior of the newly established American Civil Government in the Philippines, moved for the centralization of all scientific activities under one institution. Dr. Merrill and his botanical work had to move to the Bureau of government laboratories on Calle fris. In 1906 that institution was to become the Bureau of Science.

One of Merrills foremost ambitious during those years was to prepare and publish a general flora of the Philippine which would cover all plants in the higher groups known to exist in the archipelago. The project, however, never materialized due to the call of other pressing duties and commitments in his capacity both as administrator and professor. For six years (1912-1918) he had to give some of his working hours to teaching. Looking back years later he believed those years should have been the most productive ones of my Philippine career in reference to output in Systematic Botany. But he could not find the needed leisure to engage in so exacting a task as plant classification. And when he had completed his academic assignment and thought he could look forward to satisfying that ambition he was given an appointment which he describes as “unlooked-for and personally undesired.. that of Director of the Bureau of Science. He filled that post from 1919 to 1923.

If he was no to satisfy his ambition as author of a general flora of the Islands he did make a name through a work dealing with the floral specimens described by Blanco. Merrills' book entitled Species Blancoanae summarizes its text content in its sub-title, A Critical revision of the Philippine species of plants described by Blanco and by Llanos.
The work lists and explains the various species by order, family, genus, and species and carries important bibliographical information in the thirty pages of its Introduction. A map appended to the publication localizes the places where Blanco in his Flora de Filipinas, arranging the list first by genera, followed by an index to the native names and another to Latin names. In his introduction to his book Merrill presents the general background connected with the various editions of Blanco and points out that the Novissima appendix of Villar and naves was his main source in the preparation of the review. Merrill likewise mentions that in 1905 only 289 out of 1,127 species and varieties described by Blanco were still unidentified. In addition, in the second of a twelve-part series of studies under the title New or noteworthy Philippine plant., Merrill describes sixty new species not found in Blanco’s list and identifies unknown or imperfectly known species recorded by Blanco.

In 1917 Merrill put out a valuable study, Interpretation of Rumphitus’s Herbarium Amboinense, which was compiled on the basis of actual exploitations of Amboina with special reference to localities cited by Rumphius, native names, and economic uses of plants. This work, together with the Species Blancoanae, deserves commendation for summarizing the results of the first experiment at actual explorations of classical localities, such as Amboina and parts of the Philippines form where Blanco had secured his materials. One of the results of Merrill’s exploration was the proper interpretation of species inadequately described by those earlier authors.

His six years of teaching referred to a little earlier were spent at the University of the Philippines as part time professor of botany. In 1919, however, an unfortunate incident occurred that was to put a stop to his academic career in the Islands. Owing to a rider in an appropriation bill, no part time employee of the University could receive in excess of a certain specified salary. Merrill’s was in excess of the sum allowed. He was directed to refund the University of the Philippines, which he did, but he also turned in his resignation from Philippine service. Meanwhile, a legislative provision for certain classes of employees continued providing (on a special contract basis) for salaries of technical men in excess of those authorized in the budget. The Bureau of Science negated his resignation and instead presented him with a special contract, this time free from all duties at the University.

Late in 1919 he was called upon to assume the directorship of the Bureau of Science. He politely turned down the offer, but Governor-General Harrison pressured him into acceding. I accepted the position with diffidence, but it was a job that had to be done. During his term as Director he enlarged the facilities of the Serum Laboratory. The activities of this laboratory were transferred to Alabang, twenty five kilometers south of Manila, in order to provide space for expansion. This instance showed how his own interest in systematic botany did not prevent him from providing that the other disciplines of the Bureau develop and prosper. As Director he was expected to have some working knowledge of the activities going on in those other specializations. This meant some acquaintance with such subjects as geologic history, hydrography and
climatology of regions adjacent to the Philippines, and the zoological literature of the entire Malaysian region. As a matter of fact, those fields had some bearing on his plan to correlate the present day geographic distribution of animals with geologic history. The exotic phase of comparative philology likewise engaged his attention, specifically the influence of Sanskrit, Chinese and Aztec plant names in our flora. Merrill was concerned with determining when and how these elements had been introduced into botanical literature.

The initial publications of the Bureau of Government Laboratories were in the form of free bulletin. As early as 1904, Dr. Merrill in collaboration with Dr. Paul C. Freer, first director of the Bureau of Science, contemplated the establishment of a serial type of publication strictly on the subscription and exchange basis. When the plan materialized in 1906, Dr. Merrill was a constant collaborator, giving much of his time and effort to the success of the publication. He was made editor of the botanical section of the Philippine Journal of Science, a responsibility he diligently discharged up to 1918. As a matter of fact, from 1907 to 1918 he not only edited all the manuscripts of that section, during his editorship, the protracted series of papers began in 1904, entitled "New and noteworthy Philippine plants, already mentioned earlier.

Merrill’s last eight years in the Philippines saw him develop an interest in the flora of southern China. This began as a result of two trips he made to Canton and Nanking during his vacation weeks. The knowledge he acquired in this field of botany was to prove valuable for him in his future taxonomic work with plants from China. During one of these Chinese botanical expeditions he came across a specimen of the fruiting trees of Metasequoia which Merrill described as “living fossils”. The discovery excited his scientific curiosity to the extent that he turned into a modern “Johnny Appleseed. He acquired a large supply of these seeds for distribution to those willing to plant them on a trial basis. At one European horticulture meeting he made quite an impression by stepping up the speaker’s platform with pockets bulging with seeds of the unusual plant. Up to his last years his interest in the distribution of that plant never waned.

Seven years after his arrival in the Philippines he married Mary Augusta Sperry in Manila. The children of this union were Lynne, Dudley Sperry, William Noyes, and Anne. In June of 1914 the couple decided that the following year the children would be sent to the American mainland for their education. Mrs. Merrill was to go with them. Dr. Merrill remained, and did not join his family for the next eight years, except for a very brief period in 1920.

An event in 1923 changed his plans and would bring about his permanent return to his native county. In September of that year he received an invitation from President W.W. Campbell to the Deanship of the College of Agriculture of the University of California. After some deliberation, he accepted the offer which, as he admits, was strongly influenced by the fact that.. there was a family to consider. In my own mind... if I had no family dependent upon me, I would have elected to remain in the Philippines, in spite of the flattering opportunity in California. He was also fearful of his future as a public servant because of the
lack, at the time, of a retirement pension and his status under special contract which was subject to cancellation at the end of any fiscal year. It was indeed unfortunate that circumstances both personal and political and extraneous to his scientific interests brought about the loss for the Philippines of a very valuable and devoted investigator of our native flora.

Dr. Merrill sailed out of Manila.. with a feeling of extreme regret.. but surrounded with the goodwill of all his colleagues and assistants in the bureau of Science and that of the general public. The leading paper at the time, La Vanguardia, in his editorial commenting on Merrill's departure described him as .. casi mas Filipino que Americano .. so much had he tried to assimilate our culture and our outlooks. His first year at the Berkeley campus saw him often gaze at the Golden Gate and ponder.. that I were on an outward-bound steamer en route to the distant green pastures of the Orient where, from long residence, I had a reasonable familiarity with the problems that came up from day to day.

By July, 1924 in addition to his duties as Dean of the College of Agriculture he was made Director of the Agricultural Experiment Station at Riverside, California. This new assignment carried with it a heavy dose of administrative activities, which made Dr. Merrill turn to systematic botany, whenever he could, as his safety valve for .... Once in the herbarium, I immediately forgot my administrative problems and became merely a botanist interested in botanical matters only. During his six years at the University of California he built up an oriental reference herbarium and prepared numerous papers on plans of China, Borneo, and the Philippines.

In June, 1929, Dr. Merrill was offered the position of Director-in-chief of the New York Botanical Garden. He accepted it. Why did he elect this transfer? In his autobiographical notes he refers to the fact that agriculture was not really his specialization, and if he were to continue in administrative work he preferred to do so in the botanical field. This appointment was silent testimony from his own peers and countrymen to the value and prestige of his work in botany. The New York Botanical Garden we must recall holds a place of distinction as a research center in various aspects of the plant kingdom.

Merrill remained in New York until 1935 when he accepted his third transfer as a career man, but this one, aside from the handsome remuneration, afforded him a fuller dedication to his first love. Harvard University invited him to become Arnold Professor of Botany, Administrator of its Botanical Collections, and Director of the Arnold Arboretum. He was to retain at Harvard for eleven years, until his retirement on July 3, 1949. It was then that ill health forced him to give up the much relished hours spent in its campus. With the improvement on his health, however, he returned to systematic botany giving to it the fulltime which his administrative duties had taken up. Indeed, his botanical interests were always, in Merrill's own estimate, not a task to be carried out but a pleasure to be enjoyed. To the very end botany was for him an art as well as a science, pursued with unusual depth of erudition and artistic intensity.
Dr. Eduardo Quisumbing, a close associate of Merrill, who met him in 1915 during his years as a student at the Philippine College of Agriculture, recalls one of his meetings with his former mentor. They met for a moth in 1954 at the Harvard University Campus. From August to September of that year Dr. Quisumbing visited the Merrill family quite often. He observed that during the mouth of August he was still able to negotiate the stairs but toward September he was forced to transfer his bedroom to the ground floor. Even so, he was busy putting the finishing touches to his final publication. This classical work was The Botany of Cook's voyage and its unexpected significance in relation to anthropology, biogeography, and history, which appeared later in Chronica Botanica. This work was prepared by Merrill after examining the manuscript records of the early expeditions to the Pacific Islands, and jotting down his own personal observations about them.

From 1899 to 1902, Dr. Merrill had written about 25 scientific articles, mostly on grasses. From 1903 to 1946, he had published no less than 478 papers, so that during his entire professional lifetime he put out over 500 publications. These studies included mainly descriptions of new plants found mostly in the Pacific area, and difficult interpretations of fundamental but half-intelligible every works on Oriental botany. Of these, 145 were on the flora of the Philippines, 54 on china, 30 on New Guinea, and over a dozen each on islands such as Sumatra, Borneo and Java. He contributed so profusely. Not only to botanical science, but also to botanical literature that Houston does not hesitate to assert, Merrill was a giant among botanists and a titan among the Americans who worked in the Philippines. His contributions to botany are so numerous as to appear incredible. As a matter of fact, his botanical notes and cards, properly indexed, offer a rich source of material for the botanist eager and determined to organize them for publication.

A by-product of these extensive botanical studies was his introduction of one-word title citations of scientific periodicals as a means of simplifying the task of citing botanical journals. Words such Amoldia, Brittonia, Higaardia and Sargentia are examples of these Merrill-coined titles. He did write some articles in defense of these one-noun journals. He, likewise, named more than in his honor. The Magnolia (Merrill) in the northern regions and the Merrill Palm (Adonidia Merrill) in the tropics perpetuate his memory among plant scholars and lovers.

During the years as collaborator of the Philippine Journal of Science he undertook extensive work on a book that was to be eventually published under the title Enumeration of Philippine flowering plants. This study was, in his own estimation... the most extensive and in some respects the most difficult publication... ever undertaken by him. It attempted to account for all binomials accredited to Philippine flora, adjust the synonyms, cite all pertinent reference and illustrative collections when called for, determine the Philippine and extra-Philippine distribution of each species, and record their native names. The approximately 1,700 titles of that work's bibliography of Philippine botany start with that of Clusius in 1601 and ends with one entered in 1925.
Mention should be made at this point of Merrill’s efforts to gather accurate bibliographical material of the plant life in various parts of Asia. During his years in the Philippines and in his own native country he was able to publish, among others, the botanical bibliography of Borneo, Eastern Asia, the Philippines, the Central pacific Islands, and Polynesia. He was able to publish the Polynesian botanical bibliography and the 719 pages of the bibliography of Eastern Asiatic plants with the assistance of co-laborators during his yeas as Director of the Arnold Arboretum of Harvard University. His Botanical work in the Philippines includes a valuable bibliography on Philippine flora. In it he included those publications available at the time, those ordered and periodicals subscribed to by the Bureau of Agriculture. He likewise indicated botanical libraries in Manila and collections of Philippine plants existing in European and American herbaria.

In six issues of the Philippine Journal of Science, Merrill put together an index to botanical literature of the Philippines which contains fifty-five annotated entries, at times rather extensively and with references to kindred literature. It is the course of this bibliographical survey that Merrill points out that Clusius (Charles de l’Eclue) made the first citation of Philippines plant literature in 1601.

His Philippine botanical dictionary published by the Bureau of Government Laboratories in 1903 lists in alphabetical order both the native (part one) and scientific (part two) names of Philippine plants. Also entered are the family of each genus and brief notes on species with economic importance. He lists about 5,000 plant names taken only from about a dozen of the 81 languages and dialects spoken throughout the archipelago. Aside from names gathered from specimens in the herbarium, Merrill used a variety of other sources, among which were Blanco’s first two editions of the Flora de Filipinas (1837, 1845) and the Novissima Appendix ad Floram Philippinarium (1180-1883) of Fernandez-Villar and Naves.

Unlike his publications during the years of the First World War those between 1934 and 1945 reflect his concern to help his country win in the international struggle. This is understandable when we call that the period between 1914-1918 found him in the rather undistributed area of the Philippines, while the years between Pearl harbor and Hiroshima saw him teaching botany at Harvard University. The titles of some of the articles suggest his interest in plants as sources of poison. In 1943 he worked on “Emergency food plants and poisonous plants of the Islands of the Pacific, and two years after on “Contact poison plants in the Old World tropics, both of which were published under the auspices of the armed forces of the United States. The Pacific campaign, too found an echo in his renewed interest on Asian botany, in studies such as “The Vegetation of Malaysia, and “Plant life of the pacific world, the latter issued as a Fighting forces Edition of the Infantry Journal. During that time he also made a study of plants as food sources, particularly those of value to fighting men in the field.

Merrill’s interest as an another of botanical studies included writing about the life and achievements of colleagues who deserved public commendation for their scientific work, and during the years of the last War, recording for posterity the
fate of two repositories of botanical knowledge, the Berlin and the Manila herbaria. We thus find among his writings the biographical sketches of Charles B. Robinson, Nathaniel Lord Britton, Kenner Kent Mackenzie, Palisot de Beauvois, William Henry Brown, Sir David Prain, Tomas Barbour, and Merritt L. Fernald. Two articles have recorded his interest and concern for the Berlin Herbarium and the Bureau of Science in Manila, devoting to the latter a rather extensive presentation based mostly on his own recollections and personal dealings with that Bureau. This was quite a contrast with an article penned by him in joyful and laudatory strains almost a quarter of a century earlier. But recalling and writing about his Philippine years was always rather easy for Merrill, even during his ailing years. Until shortly before his death failing sight and winning strength did not prevent him from Manila who might give him some news about a country he had long ago learned to cherish.

A number of articles published towards the latter half of his professional life disclose his interest in ethnobotany which studies the origins of cultivated plants in relation to the origins of civilizations. A review of the titles of those papers bear witness to his lively interest in that aspect of botany. The Origin of cultivation in relation to the origin of cultivated plants, “Crops and cultivation, “Crops and civilization, cultivated plants, and the origins of civilization, Crops and civilizations, Plants and civilization, Domesticated plants in relation to the diffusion of culture, and “Man’s influence on the vegetation of Polynesia, with special reference to introduced species.

Merrill's botanical studies, as crystallized in his varied and numerous publications in the opinion of a noted Philippine man of science., established his work as the secure and ample foundation of all such future work in this region. In this regard we must not overlook Merrill's valuable contributions to herbarium methods, which had become during his time considerably static. His innovations came in the form of colored schemes of the genus covers. He incorporated original description on the sheets. The specimens would take a variety of forms, like photographs of types, of authentic specimens, photostat copies of illustrations, dissections of flowers in pockets and even original sketches of dissected flower parts. In brief, Merrill's technique collated the herbarium and library references into one form.

Many honors came along his way as his prestige in the field of botany grew and spread. As early as 1919, he was a Corresponding Member of the Malayan Branch of the Royal Asiatic Society (Singapore). In 1923 he was accepted as member of the national Academy of Science of Washington, D.C. A year later two organization included him in their roster – the Museum National d’Histoire Naturelle in Paris, and the Naturhistorisches Museum of Vienna. The Deutsche Botanische Gesselschaft made him a corresponding member in 1925, and four years later he received a similar honor from the Peking Society of Natural History.

From 1931 on, hardly a year or two went by without his personal mail including an invitation to join an honorary society, accept an award, or receive an honorary distinction. Among these were:
1931 Acting President, American Association for the Advancement of Science Meeting.
1931 Member, Latin American Committee of Selection of the Guggenheim Foundation
1931 Trustee, Horticultural Society of New York (office held until 1935)
1932 Member, American Philosophical Society
1936 Honorary Member, Japanese Botanical Society
1937 President, New England Botanical Club
1937 Academico Honorario, Universidad Nacional de la Plata (Argentina)
1938 Advisory Editor, Chronica Botanica
1938 Honorary Member, Kon-Nederlandsch Aardrijkskundig Genootschap.
1939 Corresponding Member, Institute Genevois
1940 Associate Member, Museum national d’Histoire Naturelle (Paris)
1941 Honorary Member, Royal Agricultural and Horticultural Society of India.
1943-45 Consultant to the Secretary of War, United States Government
1946 Honorary Foreign Member, Edinburgh Botanical Society
1946 Honorary Foreign Member, Kunglsvenska Vetenskapsakademien.
1946 Member, Advisory Scientific Board, Gorgas Memorial Institute
1946 Member, Board of Directors, Escuela Agrícola Panamericana.
1946 Honorary Fellow, Royal Society of Edinburgh
1950 President, Section of Nomenclature Seventh International Botanical Congress, Stockholm
1950 Grand Medaille Geoffrey Saint Hilaire
1950 Doctor of Science, h.c. Yale University
1951 Foreign Member, Swedish Academy of Science.
1953 Foreign Member, Netherlands Academy of Science.
1954 Correspondent, Académie des Sciences d’Institut de France.
1954 Vice-President, International Council of Scientific Unions

Even today the scientific work which Dr. Elmer D. Merrill pioneered in the Philippines remains a peerless achievement. It was through his efforts that botany in our country was formalized and given systematic application as a distinct science. Dr. Leon Ma. Guerrero utilized botany as a bridge to improve the health and industry of the Philippines; Dr. Merrill probed into our native flora for its own sake, for the sheer joy of knowing it in a systematized way. His exchanged
method of accumulating botanical specimens, his extra-Philippines explorations, his renovation of herbarium methods and techniques, together with his numerous literary contributions and expository treatises on pre-American botany in the Philippines are all invaluable contributions to our cultural treasures.

The appraisal Governor-General Wood made a Merrill’s work in the Philippines up to 1924 continued to be true and took an added luster all through the remaining years of his active scientific career:

You have done first class work in everything you have attempted and have gained the confidence, respect and support of those with whom you have come in contact. You have done much to build up the insular service and have added a vast amount of valuable information to out knowledge of the flora and fauna of the Islands.

Your resignation results in a great loss to the Philippine public service one which will be keenly felt and creates a vacancy which will be extremely difficult to fill.

Dr. Merrill passed away on February 25, 1956 in Cambridge, Massachusetts. His was an eloquent life dedicated to one cause and one ideal, pursued beyond self and the frontier of the land of his birth.

NOTES

2. Carolus Linnaeus, born Karl von Linne, was a Swedish botanist (1707-1778), zoologist and professor who devised systems of classification for plants and animals. He played a prominent role in improving the taxonomic aspects of botany.
4. Gramineae is a large family of monocotyledonous plants of the order of Graminales. It includes some grasses and bamboos.
6. Ibid., p. 343.
10. Ibid., p. 339.
11. Ibid.,
13. Ibid., p. 341.
14. Cryotogamic botany studies the old primary division of plants known as Cryptogamia. This comprises plants without true flowers and seeds, like the fern, mosses, and thallophytes.
15. Ibid., p. 341.
16. Ibid.,
17. Agrostology is that part of botany that deals with grasses.

18. Ibid., p. 345-346.

19. Buitenzrg is a city of Java, near Jakarta. It is the site of one of the oldest ranking Asian botanical institutions with reference of note.

20. Our noted botanist, Dr. E. Quisumbing considers Merrill’s exchange program to have been a very farsighted policy that, in retrospect was to have a double effect. One directly intended by Dr. Merrill, was to facilitate taxonomic studies on our flora; another, not then perhaps fully appreciated was to diffuse knowledge of our botanical specimens in foreign research centers. Little perhaps did Merrill then realize that this secondary value of the exchange program would be the only way to resume in Manila adequate research on Philippine flora after the ravages of World War II. The national herbarium together with the entire botanical library of Merrill’s time was completely destroyed by the Japanese armed force in 1945.

In 1946, Dr. Merrill then at Harvard University, gave a grant of one thousand dollars to help rehabilitate the Philippine national Herbarium. In fact, he helped also in the identification of thousands of plants now deposited at the same herbarium. In, Eduardo Quisumbing, “Elmer Drew Merrill, Philippine Journal of Science, 85 (June 1956), 181-188.

21. Merrill had requested the assistance of European specialists to help him identify and classify all Philippine species of fungi, algae, mosses, lichens and hepatics, as well as some of the ferns and such genera as Pandanaceae, Palmae, Cyperaceae, Gramineae, Sapindaceae, Acanthaceae.

22. Bartlett and McVaugh, Ed. Merrill, p 349-350. By 1923 there was known from the Philippines about 8,500 species of flowering plants, approximately 1,000 species of ferns and fern allies, and some 5,000 species of cellular cryptograms, totaling approximately 14,000 different species altogether. Moreover, the exact status of most of the species in Blanco’s Flora de Filipinas had been determined. It should be noted that several hundred species had been described by Blanco and his successors in the Philippines, but these were still inadequately known since no specimens representing them were extant. Furthermore, Blanco had not made a herbarium.

23. Ibid., p. 350.

24. Ibid.


26. Francisco Manuel Blanco was an Augustinian friar who came to the Philippines in 1805. He must have collected many plants which he failed to preserve. Fr. Blanco was the first to write on the flora of the Philippines. Antonio Llanos, also an Augustinian friar, arrived in the Philippines after Blanco, and have also an interest in our native botany. Some of the specimens he collected have been preserved in Leiden, erroneously credited to Blanco; some in Geneva; and over a hundred specimens in Madrid. His works were published together with Blanco’s flora de Filipinas third edition, in 1837.


29. George Everheard Rumphius was born in Germany in 1621 and died in Ambon on June 15, 1702. Ambon is one of the islands of the Moluccas group on the north side of the Banda Sea and not far from the western end of New Guinea. In the history of Malayan botany it is of preeminent importance as Ambon is the type of loyalty of several hundred botanical species, many of which were very imperfectly characterized by early authors. The treatises of Rumphius on the Herbarium Amboinense is a classical work on Malayan flora and one that is absolutely essential to the modern taxonomist. This is not because of any system of classification proposed, for the work follows no definite system; nor on account of the priority of its names, as the work is pre-Linnean, and binomial names which appear in text are merely accidental. The great value of the work is due to the fact that later authors have made the Rumphian descriptions and figures the actual “types” of many binomials. As an original source the Herbarium Amboinense stands preeminent among all the early publications on Malayan botany.
See, E.D. Merrill, (An) Interpretation of Rumphius's Herbarium Amboinense (Manila: Bureau of Printing, 1917). Dr. C.B. Robinson, a collaborator in this project, traveled to Amboina and was largely responsible for the compilation of data on the Rumphian species. His murder by Amboinan natives on December, 1912, obliged Merrill to complete the task of publishing a critical consideration of the Herbarium Amboinense. See, also, Bartlett and McVaugh, E.D. Merrill, p. 355.


33. His departure coincided with a period of political storms. The Wood administration had then antagonized the Philippine Legislature and several Filipino leaders. This situation climaxed in the deplorable "Cabinet Crisis" of 1923. Dr. Merrill admitted that Governor-General Wood needed his personal confidence and unbiased views which have seldom coming from other opinionated and sopanthic subordinates of the Executive. I had become rather intimately acquainted with him but even when he intimated to me that I might be advanced to the Presidency of the U.P., I did not feel justified in signifying an interest in it because of the peculiarly complicated political conditions that went with it. (Ibid., p. 359.

34. Ibid., p. 359.

35. Ibid., p. 359-362.

36. Ibid., p. 364.

37. It was Dr. Merrill who secured for Dr. Quisumbing a fellowship of the National Research Council of the United States, a rare privilege for a Filipino. The grant brought the latter to the University of California in Berkeley, and it was there that Dr Quisumbing deepened his close association with Dr. Merrill.


41. Elmer D. Merrill, (A) Simple change in anme, "Amoldia, (1941), 1-2; One name periodicals, Brittonia, 1 (1931), 1-5, Saxgentia, 1 (1942), iii-iv.


43. Bartlett and McVaugh, E.D. Merrill, p. 357.

44. Many systems have been proposed in the course of time, to classify plants. AS early as 1933 Casalpino had done away with any system of classification based on such variable organs as roots, stem, or leaves. He had concluded that the flower and the fruit offered the only basis for such a classification. It remained, however, for Carolus Linnaeus (1707-1778) to bring order to the situation. He invented the binomial too) should be identified by a name designating the genus and a qualifying adjective limiting the species named. The system of Linnaeus was a purely artificial one since it was based on the number of stamens and pistils, but it did make it easy to refer to a description and in that way to verify an identification. He also grouped plants and animals in larger divisions, the classes and orders. With the work, however, of the French taxonomist, A.L. de Jussieu, came a definite knowledge of the natural relations of plants which he grouped into fifteen classes with about a hundred years. Of late chemotaxonomy attempts to develop a classification system based on the chemical constituents of plants.


46. Elmer D. Merrill, Index to Philippine botanical literature. I' Philippine Journal of Science, 2-C (1907), 241-250, II, 345-349, III 437-439; 3-C (1908), 87-94; 4-C (1909) 677-685; 5-C (1910), 259-266.

47. Elmer D. Merrill, Dictionary of plant names of the Philippine Islands (Manila: Bureau of Public Printing, 1903).


52. Elmer d. Merrill, Charles Budd Robinson, Jr. Philippine Journal of Science (Botany), 9 (1914), 191-197.
60. Elmer D. Merrill, Destruction of the Berlin Herbarium Science, II 98 (1943), 490-491; Distribution of the Bureau of Science at Manila, Science, II (1945), 101-104.
62. Botany is divided into various subordinate sciences. Among these are plant geography which studies the distribution of plants on the earth; phytopathology, the diseases of plants; paleobotany, the plant fossils; and economic botany, the uses which man has found for plants and plant products.

SCIENTIFIC CONTRIBUTIONS
(Selected)

13. 1904 New or noteworthy Philippine Plants I. Manila:Bureau of Printing.
14. 1905 New or noteworthy Philippine plants. III. Manila: Bureau of Printing.

17. (A) Review of the identification of the species describe in Blanco’s “Flora de Filipinas” Manila: Bureau of Printing.


25. 1908 Index to Philippine botanical literature, IV. Philippine Journal of Science (Botany) 3: 87-94.


27. New Philippine plants from the collection of Mary Strong Clemens. I. Philippine Journal of Science (Botany) 3:385-442.


32. 1909 Index to Philippine botanical literature. V. Philippine Journal of Science (Botany). 4: 677-685.


35. New or noteworthy Philippine plants. VIII. Philippine Journal of Science (Botany) 4:247-330.


37. Index to Philippine botanical literature, VI. Philippine Journal of Science (Botany) 5:259-266.


41. 1912 (A) Flora of Manila. Manila: Bureau of Printing. New or noteworthy Philippine plants IX. Philippine Journal of Science (Botany) 7:2559-357.


44. (The) Pineda monument and the probable site of first botanic garden in the Philippines. Philippine Journal of Science (Botany) 7:363-369.

50. New or Noteworthy Philippine plants. X. Philippine Journal of Science. (Botany) 9:261-337.
60. 1917 Contributions to our knowledge of the flora of Bomeo. Jour. Straits Branch R. As. C\ soc. 76:75-117.
70. 1919 New or Worthy Philippine plants, XV. Philippine Journal of Science. 14:239-250.
72. Comments on cook’s theory as to the American origin and pre-historic Polynesian distribution of certain economic plants, especially Hibiscus tiliaceus Linnaeus. Philippine Journal of Science, 17: 239-323.
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116. 1934 Contributions to our knowledge of the Kwangtung flora, 2 (with W.Y. Chun). Sunyatsenia. 2: 3-22.
128. 1938 (A) bibliography of easem Asiatic botany, (with E.H. Walker). Jamaica Plain, Mss.
135. 1943 Emergency food plants and poisonous plants of the island of the Pacific. War Dept. Tech. man. 10-420; 1-149.
141. 1949 Index Rafinesque. The plant names published C.F. Rafinesque with reductions and a consideration of his methods, objectives, and attainments.
142. 1950 Brief survey of the present status of Bornean botany. Webbia. 7: 309-324.
Anacleto del Rosario y Sales  
(1860-1895)  
Father of Laboratory Science

Hardship like poverty may lead either to the depths of oblivion or the heights of glory. The road to these two goals cuts across each man’s life and may spell defeat for one man but success to another. For young Anacleto the ascent to glory was most trying but where others would have given up in defeat he kept moving ahead and by preserving effort finally achieved the hall of fame among Philippine men of science.

Nature, so exuberant in our country, fired his curiosity and stimulated his mind to such an extent that he yielded to his persistent calls and opened up to his scientific insight some of her treasures in bedded in plants, soils, waters, and untapped mineral deposits. In a chemical research and carved out for himself the reputation of being the foremost analytical chemist of the Philippines in the nineteenth century.

The inauguration of the Laboratorio Municipal de la ciudad de Manila in 1887 meant that the Philippines could finally rely on the services of a competent scientific laboratory to meet the increasing demands for quality control of such essential items like food, drink and pharmaceutical products. For del Rosario it meant a dream fulfilled, or public service under the aegis of Science. In 1886 he took the competitive examinations held at the Casa de Moneda in Manila. His written thesis for the examination describes the analytical procedures particularly of a volumetric kind, as well as the equipment required in a municipal laboratory. So creditable was his performance that he was selected the first Director of the Manila City Laboratory, despite opposition from some of the Spanish authorities.

His official position as government chemical analyst allowed him to undertake the study of the important medicinal water found in Sibul (Bulacan), Aguas Santas (Los Baños), Aguas de Galas (Matibak, Laguna) and Aguas de Jigabo (Albay). He was able to study in a relatively short span of time over a hundred springs then in existence in Luzon alone. The analyses of Don Anacleto were published in two works sponsored by a royal scientific commission then undertaking the study of the mineral water in the Island of Luzon. Both the Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon (1890) as well as the Estudio descriptivo de Algunos manantiales de Filipinas (1893) helped to establish del Rosario’s reputation as an analytical chemist. Together with his ability to handle the test tube, another talent of his was being developed. His enthusiasm in scientific studies moved him to share his findings and experiences with the general public. Had he lived in our times he would have attracted the attention of publishing firms by his prolific writings, his wide range of scientific interests and his ability to popularize scientific interests, and his ability to popularize scientific information.
Del Rosario’s scientific works are still preserved for us, at least in the Filipiniana Section of the Library of the University of Santo Tomas. In his treatise Los Olores del Pasig he notes by way of introduction, that the Pasig River of his time did attract the attention of the inhabitants of Manila, at least for its foul odor. In the first part of his study he offers possible explanations for such a condition. He rejects the hypothesis that there are due to the organic decomposition of vegetable matter deposited on the river bed. Likewise he dismiss the theory that decaying fish floating on the Pasig are responsible for those odors. Instead he proceeds with a microbiological analysis of the water and shows that Protococcus organisms accelerate the putrefaction of the natural products carried by the river as it flows towards Manila Bay. His experimental procedure is mainly of a qualitative kind, and he points out the need for more extensive studies of a quantitative nature. He suggests that a microbiological and chemical laboratory in Manila should be organized to safeguard the health of its inhabitants.

A glance at his bibliography of eighteen titles shows his familiarity with French scientific works together with his awareness of similar studies conducted abroad. One of these titles is Pasteur’s own work on microbial life. In 1887, he published a scientific monograph, Apuntes sobre la estudio de un Nuevo entofito. Here he reports the discovery of what he suspects to be a new species of pathogenic parasite, first noticed by him in human stool. After describing the medical history of the patient, he gives a detailed description of his observations and background studies. Del Rosario classified the organism as a parasite of the Ascomycete group which at the time belonged to an unclassified genus and species. The printed monograph contains a plate of line drawings of the microorganism as described by del Rosario. This very fine plate reveals his keen and methodical power of observation.

That same year, Don Anacleto put out a booklet cataloguing the various types of analyses performed in his laboratory and the corresponding service fees. The fourteen printed pages offer a varied and extensive list of analytical procedures, mostly biochemical, which includes such diverse products as agricultural crops, fertilizers, ores, foods, water, alcoholic beverages, and pathological specimens. This latter includes the microscopic analyses of neoplastic tissues of possible cancerous origin. This booklet is a tribute to his scientific versatility in laboratory techniques.

The medical journal, Cronica de Ciencias Medicas, in its issues for 1895 published two chemical studies of Don Anacleto de Rosario. They are posthumous tributes by the editorial staff to the excellence of his scientific works. The first of these reports, entitled, La Leche fe Caraballa, challenged the practice common then in Manila of using the same laboratory techniques in the analysis of carabao and cows, milk. Del Rosario rejects the hypothesis that the chemical composition of carabao milk is identical with that of the cow. He presents the results of a preliminary study which compares some of the physio-chemical properties of both types of milk. After proving his point, del Rosario suggests certain corrective
factors that have to be taken into account for an accurate evaluation of carabao milk.

The second monograph, *Analysis de la Orina en el Beri-beri*, discusses the chemical analyses of the urine of a patient suffering from beri-beri. This work was valuable to the medical diagnostician of the time, but like other biochemical studies of del Rosario, it did not attempt to correlate his data with that of other investigators, or to gather sufficient information to make the conclusion statistically significant. We must remember however, that these analytical studies of Del Rosario were undertaken as the need arose, usually in the form of samples sent to him for analysis by his physician friends.

Aside from this, del Rosario wrote other valuable scientific papers.

One of the greatest laboratory achievements of del Rosario involved the study of a Philippine flower, the ilang-ilang. Both the importance of this pioneer work in Philippine phyto-chemistry as well as the opportunity to know how del Rosario, the scientist, went about a specific problem requires a description at some length of his ilang-ilang. For this last research of his fresh flowers of Cananga adorana. Steam distillation of these raw materials at 50°C produced an oil, slightly yellowish in color and possessing a delicate but penetrating odor. The oil was then dried with pure and fused calcium chloride and found to have a specific gravity of 0.905 at 30°C. Del Rosario observed that this oil was completely soluble in ether, benzene, chloroform, absolute alcohol and in fixed and essential oils. It was less soluble in 90°C alcohol and almost insoluble in water or glycerin. At 130°C the essential oil boiled at normal pressure and continued to do so until decomposition set in and combustible gases were produced. These were non-condensible at ordinary temperature. The oil continued to distill up to 350°C and then began to yield denser and empyreumatic substances.

Don Anacleto determined the specific rotation of this oil product as:

..laevorotatory when directly observed in a Dubosq polarimeter with monochromatic sodium light in a tube 20 cm. long. The oil gave -60° at 30°C. It gives a specific rotation of:

\[
\begin{align*}
\nu &= \frac{61^o0'}{2 \times 0'905} \\
&= 33^o42' \\
&= 33^o70'
\end{align*}
\]

In alcoholic solution, its rotatory power increases slightly. Thus a solution prepared from 50 grams of the essential oil with sufficient absolute alcohol to make 1000 cc., gave a reading of -3°27'30°C in a 20 cm. tube; or
Del Rosario determined the important chemical characteristics of ilang-ilang oil by means of the following test:

When shaken in a small graduated cylinder (used for solubility determination) with an aqueous solution of potassium hydroxide 30oB, the oil loses approximately 4 to 5% of its volume, with the formation of potassium benzoate. It leaves as residue a liquid that retains for all practical purposes the original physical properties of the essential oil. The potassium hydroxide solution keeps the benzoate so formed, and the presence of the latter can be confirmed by subjecting it to its characteristic chemical reactions.

On treating the essential oil of ilang-ilang with four bisulfite in a stoppered flask, no crystallization was observed even after six days. This indicates almost certainly the absence of aldehydes in the volatile oil being studied.

When the essential oil is shaken in a test tube with ten times its volume of Perrot’s (hydro-alcoholic solution of dimethylaniline violet) two layers of liquid are formed. After standing for a few minutes, the essential oil of ilang-ilang took on a beautiful violet color. This color reaction was unmistakable, indicating the presence of an ether, alcohol, phenol, and other oxygenated compounds. It is of course well known that an essential oil made up entirely of hydrocarbons does not acquire a color.

When 10 drops of sulfuric acid, 66oB were gradually added its a test tube containing 20 drops of essential oil of Canaga a very violent reaction is observed. There is an increased in the temperature, the production of sulfurous acid identified by its peculiar odor, and the precipitation of aniline sulfite produce in a glass rod when moistened with a solution of sulfuric acid and aniline. The reaction also produces an oleoresinous substance of a pale yellow color at the beginning of the reaction and which turns pale orange as the test is completed. On cooling, this oleoresinous product was treated with double its volume of water, but without any observable change. When, however, an equal quantity of petroleum benzene is added to it and shaken, the yellowish orange color disappears and the liquid mixture turns milky. After standing for two hours this separates into two transparent layers – an upper benzene layer of a pale yellow color, and a lower aqueous colorless layer. These layers were separated by a narrow whitish zone containing carbonaceous particles in suspension. This was produced by the partial carbonization of the essential oil caused by the action of sulfuric acid. On collecting the upper layer, agitating it in a small glass capsule, and allowing it to evaporate, a solid residue with aromatic odor was obtained. The presence of benzoic is easily shown in this material by neutralizing
it with a weak alkaline solution and treating the resulting produce with dilute ferric chloride.

In contact with nitric acid the essential oil of ilang-ilang produced a violence reaction accompanied by a rise in temperature, an increase in volume of the mixture in the test tube, an abundant evolution of nitrous oxide vapors, and the formation of a yellowish layer which turned resinous. This layer, on heating gave off a solution. When greater amounts of acid were used, the oil produced a transparent yellowish liquid.

An aqueous hydrochloric solution of 20oB mixed with a small amount of essential oil of Cananga gave a weak reaction. From this reaction one may observe after eighth days the thickening of the essential oil, which also turned pale yellow. The lower acid layer on the other hand, became milky in appearance and turned a dark grayish yellow.

Five drops of the essential oil shaken in a closed tube with two or three cubic centimeters of a colorless solution of rosanilin bissulfite and then allowed to stand for a time produced nothing but a slight violet tint.

Finally, iodine mixed in an evaporating dish with the essential oil of ilang-ilang (0.05 grams of iodine and one cubic centimeter of volatile oil) produced a liquefied mixture. The iodine dissolved slowly resulting in an incomplete solution. After fifteen minutes of contact the essential oil was separated and shaken with a small amount of water. This mixture was tested with starch test solution potassium nitrite in aqueous medium, and a few drops of dilute sulfuric acid. No blue color was observed in the aqueous layer, while the essential oil became clear green. After a few minutes and under the influence of light, the color disappeared completely.

Del Rosario made a thorough comparative study of the chemical properties of the oils of ilang-ilang and of turpentine as a means of detecting adulterants in the former. He reports this part of his research in the following paragraphs.

As we have previously stated, if we treat 20 drops of Cananga oil with 10 drops of sulfuric acid 66°B, in a test tube, a violent reaction is produced with evolution of sulfurous acid and the formation of a residue oleoresinous in consistency, pale-yellowish at first and becoming pale -orange later. If the Franch oil of turpentine is tested by this method, similar results are observed. The product of the reaction apparently similar to that produced by the oil of ilang-ilang is differentiated from the latter by the action of double its volume of water and that of petroleum benzin, whereas, if the product formed is from the volatile oil of ilang-ilang the oil loses its color upon coming in contact with water or benzin. It also became milky after being shaken and allowed to stand for a period of two hours. At this juncture, two transparent layers were formed, the upper being pale-yellowish and the lower layer, colorless. The layers were separated by a thin which zone with some carbonaceous particles held in suspension. If the reaction was the result of the contact of sulfuric acid on
turpentine oil of ilang-ilang to which the different quantities of French turpentine oil were added, the formation of the milky turbid layer was persistently observed even after two hours standing when the oil of ilang-ilang thus tested only contained one to two percent by volume of oil of turpentine.

If this same test is applied to ilang-ilang with French turpentine and to which was also added a small quantity of castor oil, after standing for two hours or longer two liquid layers were formed; the milky mixture obtained from the action of water and that of benzin on sulfuric residue rendered the layer turbid. The turbidity was greater when the quantities of oil of turpentine or castor oil was present in greater amount in ilang-ilang oil.

In connection with the action of iodine that was referred to previously, in which 0.05 g. of iodine and 1 cc of pure ilang-ilang was placed in a porcelain evaporating dish, a very slow reaction took place accompanied by the liquefaction of the halogen and the incomplete solution of the latter in the ilang-ilang oil. At the end of one hour, no appreciable change was observed in the coloration of ilang-ilang oil. We have also stated that during a period of 15 minutes contact between iodine and ilang-ilang oil, part of the latter was separated and shaken with a small quantity of water and further treated with starch test solution, potassium nitrite and diluted sulfuric acid, the aqueous layer was readily colored blue, whereas the globable of the volatile oil lost its original color and acquired persistent grayish color.

In the repetition of this same test with the ilang-ilang oil, mixed with different proportions of the oil of turpentine, the iodine dissolved more rapidly and the color of the volatile oil became more prominent as the quantity of turpentine oil was increased or was added in greater quantity of that of ilang-ilang oil. As long as the ilang-ilang oil contained a minimum quantity of turpentine oil, the pale-greenish coloration of the globules of the volatile oil was formed; this was escorted as a means of characterizing the pure ilang-ilang oil when the mixture was treated with starch test solution, potassium nitrite and diluted sulfuric acid. On the other hand the lower aqueous layer was observed to acquire a bluish coloration that became more intense as the amount of turpentine was increased when mixed the essential oil of ilang-ilang.

Don Anacleto was planning to undertake a more thorough study of the chemical composition of the essential oil of ilang-ilang, but his premature death prevented its fulfillment.

His years as chemist for Ayala distillery in Manila increased his interest in alcohol chemistry to the point that he was able to perfect a formula for the purification of alcohol. He had found a way by which nipa wine acquired a color, smell, taste and strength similar to that of a Spanish wine. Alkaloid chemistry had also captured his interest and he devoted some time studying the alkaloidal principles in the Ignatius bean and the castor oil from the Palma Chirsti.
Anacleto del Rosario was born in Santa Cruz, Manila on July 13, 1860. He was the sixth of eleven children of Don Eugenio del Rosario and Doña Casimira Sales. His father was a cordon manufacturer for the Spanish armed forces, and died when he was only five years old. The family lived along one of the busy streets of the district of Quiotan, now named Sales, after the maternal family name. It was his mother who first taught him both the alphabet and the Casimira also contributed to the family's income by selling fruits and vegetables. Perfecto J. Nepomuceno, one of his earliest biographers, described the young Anacleto as gentle and sweet in deposition, and until his death, Nepomuceno noted del Rosario was a "devout Catholic."

When he was nine years old, he was put under the guardianship of a rather stern relative who supervised his schooling in a private institution. In return for his favor, Anacleto had to wash bottles in his aunt's drug store. José, one of Don Anacleto's sons, still recalls his father's description of how .... He used to escape through a small window of their home's bathroom so as to go out and borrow books from his classmates.

An uncle, who was a lawyer by profession, became his next private tutor. As the age of thirteen, he enrolled as a third year student at the Ateneo de Manila. This keen intelligence together with his seriousness of purpose and persistent diligence won for him the esteem of his fellow students and the appreciation of his professors. He was invited to join the Congregacion Mariana, a religious organization whose membership was limited to students with high scholastic and moral standing. Anacleto eventually became one of its presidents. It was during his years at the Ateneo that he made the acquaintance of another student, José Rizal y Mercado.

Even during those years at the Ateneo, he had to look for means of supporting himself, and this he did by developing his scientific abilities. He used to make and sell electric bells, household fixtures, toys and even odds and ends. Finally, on April 1, 1876 he obtained his Bachelor of Arts degree with the highest honors (Nota Maxima).

At the age of sixteen, Anacleto began his professional scientific formation. Together with his friend José Rizal he enrolled at the University of Santo Tomas in Manila. Tight family finances kept shadowing our young man's ambitions. Undaunted, he combined study and work. During his years as a university student he enrolled again at the Ateneo for the course of land surveying, and took part-time jobs. In 1881 he received from the Jesuit school the degree of Perito Tasador de Torrenos (land surveyor). He then took to surveying large tracts of land which included those of well-known families like the Aranetas in S'lay, Negros Occidental and the Lopezes in Balayan, Batangas. His services were also requested for in Bulacan and Laguna. The considerable earnings from the jobs allowed him to purchase more technical books as well as a microscope which he needed for his course in bacteriology at Santo Tomas University. Some of the books, he ordered directly from Spain to supplement those that were available
at the university library. A part of these savings he set aside to purchase a box of jewels for the girl of his dreams, Valeriana Valdezco whose parents at this time disapproved of Anacletos’ wedding plans because of his financial situation.

At twenty-two Anacleto received his first professional degree in pharmacy with highest honors (sobresaliente) and a year later, in 1883, his Master of Science in Pharmacy (Licenciatura). The university records bear a witness to his intellectual abilities:

<table>
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<tr>
<th>Course</th>
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<tr>
<td>Curso Preparatorio (11876-1887)</td>
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<tr>
<td>Historia natural</td>
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<td>Sobresaliente</td>
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<td>Primer Año (1877-1878)</td>
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<td>Materia Farmaceutica Vegeta</td>
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<td>Segundo Año (1878-1879)</td>
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<td>Materia Farmaceutica Animal y Mineral</td>
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<td>Farmacia Quimico-inorganica</td>
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<td>Sobresaliente</td>
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<tr>
<td>Cuarto Año (1880-1881)</td>
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<tr>
<td>Farmacia Quimico-organica</td>
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<td>Sobresaliente</td>
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After his graduation, he became an apprentice and later went into the druggists business. He went into partnership with Don Enrique Perez and don Benito Legarda for the importation and sale of pharmaceutical products at their drug store. Soon later, don Anacleto sold his share in this partnership and started his own Farmacia A., del Rosario on calle San Fernando in the district of Binondo. At the same time he occupied the position of chemist in the LA Rosario distillery. During the cholera outbreak of June 1882, the Governor General appointed del Rosario pharmacist member of a sanitary commission stationed at the Lazareto de Mariveles. It was during this assignments that he developed his interest in bacteriological work and made extensive studies on the pathogenic bacteria responsible for cholera. Two years later, the German bacteriologist Robert Koch isolated the Vibrio comma (cholera) and definitely identified it as the cause of cholera.

The rather high incidence of tuberculosis and leprosy cases in 1892 started del Rosario along the study of the genus responsible for these dreadful diseases. His research achieved for him the distinction of being the first to prepare and use the active principles of chaulmoogra oil in the treatment of leprosy. This was not less than twenty years before English or American scientists reported the value of such principles for leprous patients. Don Anacleto, with a humility and reticence characteristics of him, preferred to offer suffering mankind a remedy against a feared disease than to have his name publicized as the discoverer of a powerful drug. The City of Manila, however, rewarded his outstanding achievements in the field of pharmacy by granting him the Premio de la Faculty de Farmacia during the inauguration in July, 1886 of the Carriedo Water Works. He also won many awards in both national and international expositions. Among the latter were those held in Barcelona and Paris.
His enthusiasm and scholarly devotion to his scientific profession singled him out as a man of worth. This fact was recognized by others in the many positions offered him in both private and government institutions. The University of Santo Tomas appointed him professor of analytical chemistry. June 17, 1882 saw his appointments as Vocal farmaceutico (Pharmacist member) of the Commission of Health. On March 11, 1883 he became member of the Junta Inspector de Bilibid, and two years later was named Farmaceutico municipal de Binondo. An appointment dated February 19, 1887 saw him inducted as member of the Commission de Valoraciones. For three years (1885-1888) he was the secretary of the governing board of the Manila prison. In 1891 he became secretary of the Junta Inspector y Administradora del colegio de Farmaceuticos. From 1891 to 1882 he was secretary of the Chamber of Commerce in Manila.

Del Rosario is undoubtedly one of the foremost bio-chemists and pharmacists our country has produced during the last century. His interest and work in analytical biochemistry make him one of the earliest Asians to work in a scientific discipline which during his life-time was still in its infancy. His main concern seems to have been to apply to local conditions his pharmaceutical and biochemical knowledge. His ability and inclination for scientific writing made him a popular figure in the national periodicals of his time. His love of reading, his imagination, his patience, and his determination to keep on at hard tasks played a large part in the triumphs he garnered during his short span of life. Although he never left his native land for studies abroad, Don Anacleto won the respect of his peers through his work with the test tube and the pen. Rightly may he be called the “Father of Laboratory Science.”

Del Rosario finally won the heart of the former Valeriana Valdezco and had three children by her: Jose, a chemist; Luis, archbishop of Zamboanga; and Rosa. It was his close contact with pathogenic bacteria that hastened his death and his reparation from his loved ones. He died a victim of tuberculosis on May 2, 1895.

NOTES

1. Joaquin Maraño, “The) Development of phytochemical research in the Philippines, National Research council of the Philippines, Islands Bulletin, No. 5 (1935) 377. This municipal laboratory created by a decree dated 13 September 1887, was put under the control of the Gobieno de Provincias. Its main functions were to conduct biochemical analyses related to public health, and to undertake specimen examinations for clinical and medico-legal cases.

2. His competitors were Don Gregorio Olea y Cordoba, a pharmacists and Don Francisco Lamberto Massip y Valls, a physician. Lorenzo Rodriguez, Filipinos in the pharmacy world, Phil. Pharm. Assoc. no. 1 (1958) 12.

3. This part of the examinations (known as the Ejercicio) del Raosario described under the title of Principios en que es funda el enalisis volumtrico y manera de preparer los liquidos titulados para el mismo. It was published in the official gazette. See Gaceta de Manila, tomo I. (1888). 134.

4. the governor General, Exmo. Sr. don Joaquin Jovellar y Soler, created that commission by a decree of 15 December 1884. The commission's president, as organized on 31 January 1885, was don Jose Centeno, a mining engineer, replaced later by don Jose de Vera y Gomez, a physician, Don Anacleto was a member of this royal commission.

5. (Los) Olores del Pasig ensayos micro-quimicos Manila); Establecimiento Tipografico de “La Oceania Española, 1866) 62 p.


7. Que estos cuerpos estan son verdades entofotos pertenecientes a la clase de los Hongos, grupo Ascomicels y familia Discomicetes de bary y Genero y especie probablenuveos.


9. Leche de Caraballa, Cronica de ciencias medicos, ano i. t. 1 (Sept. 1895) 75-0, Analisis de la Orina en ele beri-beri, Cronica de ciencias Medicos, ano t. l. (oct. 1895) 112-115.

10. The editors have high praise for his report on beri-beri: el mas tecnico y bien presentado de cuantos hemos referente al beri-beri... (Ibid., p. 115).


12. The original paper in Spanish on Ilang-ilang oil by Anacleto del Rosario was reprinted in the Journal of the Philippine Pharmaceutical Association volume 3 (1949) 431-438. English translation by Dr. Patrocinio Valenzuela which is used here, appeared in same issue of that journal, pp. 439-446.

13. Ibid. p. 441.

14. Ibid.

15. Ibid., p. 445.


17. Don Anacleto has left a small diary entitled Mis Recuerdos bearing the date of March 7, 1880. See Jose ma. Clotet, S.J. D. Anacleto del rosario y Sales. Cultura Social, ano 11 (July 1914) 339.


19. Personal information from Dr. Jose s. del rosario.

20. In one of Rizal’s works el Filibusterismo, the personality of Anacleto del Rosario is alluded to in several chapters.

21. This was the maritime quarantine station of Mariveles.

22. This is the personal belief of Dr. Ariston Bautista as published in the Revista Filipina de Medicina y Farmacia, v. 21 (1929) 72.


26. He enjoyed verse writing to which he turned to while in bed during his last illness.

SCIENTIFIC CONTRIBUTIONS

1. 1879  Estudio sobre la unidad de las fuerzas fisicas, (Lecture delivered at the Liceo Artistico de Manila on November 22, 1879).

2. 1881  (Los) Oidios venenosos mas communes del pais.

3. 1882  Analisis quimico de las aquras mineralas.

4. 1885  Apuntes sobre el Itivan,Madrid.


7. 1887  apuntes para el estudio de un Nuevo entofito. Manila: tipolitografia
de Cofre y Cia., 1887, 27 p. (also published in Boletín de Medicina de Manila. 2. no. 29 (1887) 5-7 no. 30; 4-6, 31; 3-6.


9. 1888 Ejercicios: Principales en que se funda el análisis voluntario y manera de preparar los líquidos titulados para el mismo, Gaceta de Manila, tomo 1: 134.

10. Resultados de los análisis micro-químicos practicados en materiales reconocidos en la provincial de Manila, por la comisión nombrada para el estudio de la epizootia.
Anacleto del Rosario y Sales
(1860-1895)
Father of Laboratory Science

Hardship like poverty may lead either to the depths of oblivion or the heights of glory. The road to these two goals cuts across each man’s life and may spell defeat for one man but success to another. For young Anacleto the ascent to glory was most trying but where others would have given up in defeat he kept moving ahead and by preserving effort finally achieved the hall of fame among Philippine men of science.

Nature, so exuberant in our country, fired his curiosity and stimulated his mind to such an extent that he yielded to his persistent calls and opened up to his scientific insight some of her treasures in bedded in plants, soils, waters, and untapped mineral deposits. In a chemical research and carved out for himself the reputation of being the foremost analytical chemist of the Philippines in the nineteenth century.

The inauguration of the Laboratorio Municipal de la ciudad de Manila in 1887 meant that the Philippines could finally rely on the services of a competent scientific laboratory to meet the increasing demands for quality control of such essential items like food, drink and pharmaceutical products. For del Rosario it meant a dream fulfilled, or public service under the aegis of Science. In 1886 he took the competitive examinations held at the Casa de Moneda in Manila. His written thesis for the examination describes the analytical procedures particularly of a volumetric kind, as well as the equipment required in a municipal laboratory. So creditable was his performance that he was selected the first Director of the Manila City Laboratory, despite opposition from some of the Spanish authorities.

His official position as government chemical analyst allowed him to undertake the study of the important medicinal water found in Sibul (Bulacan), Aguas Santas (Los Baños), Aguas de Galas (Matibak, Laguna) and Aguas de Jigabo (Albay). He was able to study in a relatively short span of time over a hundred springs then in existence in Luzon alone. The analyses of Don Anacleto were published in two works sponsored by a royal scientific commission then undertaking the study of the mineral water in the Island of Luzon. Both the Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon (1890) as well as the Estudio descriptivo de Algunos manantiales de Filipinas (1893) helped to establish del Rosario’s reputation as an analytical chemist. Together with his ability to handle the test tube, another talent of his was being developed. His enthusiasm in scientific studies moved him to share his findings and experiences with the general public. Had he lived in our times he would have attracted the attention of publishing firms by his prolific writings, his wide range of scientific interests and his ability to popularize scientific interests, and his ability to popularize scientific information.
Del Rosario’s scientific works are still preserved for us, at least in the Filipiniana Section of the Library of the University of Santo Tomas. In his treatise Los Olores del Pasig he notes by way of introduction, that the pasig River of his time did attract the attention of the inhabitants of Manila, at least for its foul odor. In the first part of his study he offers possible explanations for such a condition. He rejects the hypothesis that there are due to the organic decomposition of vegetable matter deposited on the river bed. Likewise he dismiss the theory that decaying fish floating on the Pasig are responsible for those odors. Instead he proceeds with a microbiological analysis of the water and shows that Protococcus organisms accelerate the putrefaction of the natural products carried by the river as it flows towards Manila Bay. His experimental procedure is mainly of a qualitative kind, and he points out the need for more extensive studies of a quantitative nature. He suggests that a microbiological and chemical laboratory in Manila should be organized to safeguard the health of its inhabitants.

A glance at his bibliography of eighteen titles shows his familiarity with French scientific works together with his awareness of similar studies conducted abroad. One of these titles is Pasteur’s own work on microbial life. In 1887, he published a scientific monograph, Apuntes para el estudio de un Nuevo entofito. Here he reports the discovery of what he suspects to be a new species of pathogenic parasite, first noticed by him in human stool. After describing the medical history of the patient, he gives a detailed description of his observations and background studies. Del Rosario classified the organism as a parasite of the Ascomycete group which at the time belonged to an unclassified genus and species. The printed monograph contains a plate of line drawings of the microorganism as described by del Rosario. This very fine plate reveals his keen and methodical power of observation.

That same year, Don Anacleto put out a booklet cataloguing the various types of analyses performed in his laboratory and the corresponding service fees. The fourteen printed pages offer a varied and extensive list of analytical procedures, mostly biochemical, which includes such diverse products as agricultural crops, fertilizers, ores, foods, water, alcoholic beverages, and pathological specimens. This latter includes the microscopic analyses of neoplastic tissues of possible cancerous origin. This booklet is a tribute to his scientific versatility in laboratory techniques.

The medical journal, Cronica de Ciencias Medicas, in its issues for 1895 published two chemical studies of Don Anacleto de Rosario. They are posthumous tributes by the editorial staff to the excellence of his scientific works. The first of these reports, entitled, La Leche de Caraballa, challenged the practice common then in Manila of using the same laboratory techniques in the analysis of carabao and cows, milk. Del Rosario rejects the hypothesis that the chemical composition of carabao milk is identical with that of the cow. He presents the results of a preliminary study which compares some of the physio-chemical properties of both types of milk. After proving his point, del Rosario suggests certain corrective factors that have to be taken into account for an accurate evaluation of carabao milk.
he second monograph, analysis de la Orina en el Beri-beri discusses the chemical analyses of the urine of a patient suffering from beri-beri. This work was valuable to the medical diagnostician of the time, but like other biochemical studies of del Rosario did not attempt to correlate his data with that of other investigators, or to gather sufficient information to make the conclusion statistically significant. We must remember however, that these analytical studies of Del Rosario were undertaken as the need arose, usually in the form of samples sent to him for analysis by his physician friends.

Aside from this, del Rosario wrote other valuable scientific papers.

One of the greatest laboratory achievements of del Rosario involved the study of a Philippine flower, the ilang-ilang. Both the importance of this pioneer work in Philippine phyto-chemistry as well as the opportunity to know how del Rosario, the scientist, went about a specific problem requires a description at some length of his ilang-ilang. For this last research of his fresh flowers of Cananga adorana. Steam distillation of these raw materials at 50°C produced an oil, slightly yellowish in color and possessing a delicate but penetrating odor. The oil was then dried with pure and fused calcium chloride and found to have a specific gravity of 0.905 at 30°C. Del Rosario observed that this oil was completely soluble in ether, benzene, chloroform, absolute alcohol and in fixed and essential oils. It was less soluble in 90°C alcohol and almost insoluble in water or glycerin. At 130°C the essential oil boiled at normal pressure and continued to do so until decomposition set in and combustible gases were produced. These were non-condensible at ordinary temperature. The oil continued to distill up to 350°C and then began to yield denser and empyreumatic substances.

Don Anacleto determined the specific rotation of this oil product as:

..laevorotatory when directly observed in a Dubosq polarimeter with monochromatic sodium light in a tube 20 cm. long. The oil gave -60° at 30°C. It gives a specific rotation of:

\[
\begin{align*}
\text{j} &= \frac{0.61°0'}{2 \times 0°905} \\
&= \frac{0.33°42'}{1} \\
&= \frac{0.33°70'}{1}
\end{align*}
\]

In alcoholic solution, its rotatory power increases slightly. Thus a solution prepared from 50 grams of the essential oil with sufficient absolute alcohol to make 1000 cc., gave a reading of -3°27'30°C in a 20 cm. tube; or

\[
\text{J} = \]
Del Rosario determined the important chemical characteristics of ilang-ilang oil by means of the following test:

When shaken in a small graduated cylinder (used for solubility determination) with an aqueous solution of potassium hydroxide 30oB, the oil loses approximately 4 to 5% of its volume, with the formation of potassium benzoate. It leaves as residue a liquid that retains for all practical purposes the original physical properties of the essential oil. The potassium hydroxide solution keeps the benzoate so formed, and the presence of the latter can be confirmed by subjecting it to its characteristic chemical reactions.

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Finally, iodine mixed in an evaporating dish with the essential oil of ilang-ilang (0.05 grams of iodine and one cubic centimeter of volatile oil) produced a liquefied mixture. The iodine dissolved slowly resulting in an incomplete solution. After fifteen minutes of contact the essential oil was separated and shaken with a small amount of water. This mixture was tested with starch test solution potassium nitrite in aqueous medium, and a few drops of dilute sulfuric acid. No blue color was observed in the aqueous layer, while the essential oil became clear green. After a few minutes and under the influence of light, the color disappeared completely.

Del Rosario made a thorough comparative study of the chemical properties of the oils of ilang-ilang and of turpentine as a means of detecting adulterants in the former. He reports this part of his research in the following paragraphs.

As we have previously stated, if we treat 20 drops of Cananga oil with 10 drops of sulfuric acid 66°B, in a test tube, a violent reaction is produced with evolution of sulfurous acid and the formation of a residue oleoresinous in consistency, pale-yellowish at first and becoming pale-orange later. If the French oil of turpentine is tested by this method, similar results are observed. The product of the reaction apparently similar to that produced by the oil of ilang-ilang is differentiated from the latter by the action of double its volume of water and that of petroleum benzin, whereas, if the product formed is from the volatile oil of ilang-ilang the oil loses its color upon coming in contact with water or benzin. It also became milky after being shaken and allowed to stand for a period of two hours. At this juncture, two transparent layers were formed, the upper being pale-yellowish and the lower layer, colorless. The layers were separated by a thin which zone with some carbonaceous particles held in suspension. If the reaction was the result of the contact of sulfuric acid on turpentine oil of ilang-ilang to which the different quantities of French turpentine oil were added, the formation of the milky turbid layer was persistently observed.
even after two hours standing when the oil of ilang-ilang thus tested only contained one to two percent by volume of oil of turpentine.

If this same test is applied to ilang-ilang with French turpentine and to which was also added a small quantity of castor oil, after standing for two hours or longer two liquid layers were formed; the milky mixture obtained from the action of water and that of benzin on sulfuric residue rendered the layer turbid. The turbidity was greater when the quantities of oil of turpentine or castor oil was present in greater amount in ilang-ilang oil.

In connection with the action of iodine that was referred to previously, in which 0.05 g. of iodine and 1 cc of pure ilang-ilang was placed in a porcelain evaporating dish, a very slow reaction took place accompanied by the liquefaction of the halogen and the incomplete solution of the latter in the ilang-ilang oil. At the end of one hour, no appreciable change was observed in the coloration of ilang-ilang oil. We have also stated that during a period of 15 minutes contact between iodine and ilang-ilang oil, part of the latter was separated and shaken with a small quantity of water and further treated with starch test solution, potassium nitrite and diluted sulfuric acid, the aqueous layer was readily colored blue, whereas the globule of the volatile oil lost its original color and acquired persistent grayish color.

In the repetition of this same test with the ilang-ilang oil, mixed with different proportions of the oil of turpentine, the iodine dissolved more rapidly and the color of the volatile oil became more prominent as the quantity of turpentine oil was increased or was added in greater quantity of that of ilang-ilang oil. As long as the ilang-ilang oil contained a minimum quantity of turpentine oil, the pale-greenish coloration of the globules of the volatile oil was formed; this was escorted as a means of characterizing the pure ilang-ilang oil when the mixture was treated with starch test solution, potassium nitrite and diluted sulfuric acid. On the other hand the lower aqueous layer was observed to acquire a bluish coloration that became more intense as the amount of turpentine was increased when mixed the essential oil of ilang-ilang.

Don Anacleto was planning to undertake a more thorough study of the chemical composition of the essential oil of ilang-ilang, but his premature death prevented its fulfillment.

His years as chemist for Ayala distillery in Manila increased his interest in alcohol chemistry to the point that he was able to perfect a formula for the purification of alcohol. He had found a way by which nipa wine acquired a color, smell, taste and strength similar to that of a Spanish wine. Alkaloid chemistry had also captured his interest and he devoted some time studying the alkaloidal principles in the Ignatius bean and the castor oil from the Palma Christi.

Anacleto del Rosario was born in Santa Cruz, Manila on July 13, 1860. He was the sixth of eleven children of Don Eugenio del Rosario and Doña Casimira Sales. His
father was a cordon manufacturer for the Spanish armed forces, and died when he was only five years old. The family lived along one of the busy streets of the district of Quiotan, now named Sales, after the maternal family name. It was his mother who first taught him both the alphabet and the Casimira also contributed to the family’s income by selling fruits and vegetables. Perfecto J. Nepomuceno, one of his earliest biographers, described the young Anacleto as gentle and sweet in deposition, and until his death, Nepomuceno noted del Rosario was a “devout Catholic.”

When he was nine years old he was put under the guardianship of a rather stern relative who supervised his schooling in a private institution. In return for his favor, Anacleto had to wash bottles in his aunt’s drug store. Jose, one of Don Anacleto’s sons, still recalls his father’s description of how …. He used to escape through a small window of their home’s bathroom so as to go out and borrow books from his classmates.

An uncle, who was a lawyer by profession, became his next private tutor. As the age of thirteen, he enrolled as a third year student at the Ateneo de Manila. This keen intelligence together with his seriousness of purpose and persistent diligence won for him the esteem of his fellow students and the appreciation of his professions. He was invited to join the Congregacion Mariana, a religious organization whose membership was limited to students with high scholastic and moral standing. Anacleto eventually became one of its presidents. It was during his years at the Ateneo that he made the acquaintance of another student, Jose Rizal y Mercado.

Even during those years at the Ateneo, he had to look for means of supporting himself, and this he did by developing his scientific abilities. He used to make and sell electric bells, household fixtures, toys and even odds and ends. Finally, on April 1, 1876 he obtained his Bachelor of Arts degree with the highest honors (Nota Maxima).

At the age of sixteen, Anacleto began his professional scientific formation. Together with his friend Jose Rizal he enrolled at the University of Santo Tomas in Manila. Tight family finances kept shadowing our young man’s ambitions. Undaunted, he combined study and work. During his years as a university student he enrolled again at the Ateneo for the course of land surveying, and took part-time jobs. In 1881 he received from the Jesuit school the degree of Perito Tasador de Torrenos (land surveyor). He then took to surveying large tracts of land which included those of well-known families like the Aranetas in S’lay, Negros Occidental and the Lopezes in Balayan, Batangas. His services were also requested for in Bulacan and Laguna. The considerable earnings from the jobs allowed him to purchase more technical books as well as a microscope which he needed for his course in bacteriology at Santo Tomas University. Some of the books, he ordered directly from Spain to supplement those that were available at the university library. A part of these savings he set aside to purchase a box
of jewels for the girl of his dreams, Valeriana Valdezco whose parents at this time disapproved of Anacletos' wedding plans because of his financial situation.

At twenty-two Anacleto received his first professional degree in pharmacy with highest honors (sobresaliente) and a year later, in 1883, his Master of Science in Pharmacy (Licenciatura). The university records bear a witness to his intellectual abilities:

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Curso Preparatorio (11876-1887)
   Historia natural .................. Sobresaliente
Primer Año (1877-1878)
   Materia Farmaceutica Vegetal .... Notable
Segundo Año (1878-1879)
   Materia Farmaceutica Animal y Mineral ... Sobresaliente
Tercer Año (1879-1880)
   Farmacia Quimico-inorganica ........... Sobresaliente
Cuarto Año (1880-1881)
   Farmacia Quimico-organica ............. Sobresaliente
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After his graduation, he became an apprentice and later went into the druggists business. He went into partnership with Don Enrique Perez and don Benito Legarda for the importation and sale of pharmaceutical products at their drug store. Soon later, don Anacleto sold his share in this partnership and started his own Farmacia A., del Rosario on calle San Fernando in the district of Binondo. At the same time he occupied the position of chemist in the LA Rosario distillery. During the cholera outbreak of June 1882, the Governor General appointed del Rosario pharmacist member of a sanitary commission stationed at the Lazareto de Mariveles. It was during this assignments that he developed his interest in bacteriological work and made extensive studies on the pathogenic bacteria responsible for cholera. Two years later, the German bacteriologist Robert Koch isolated the Vibrio comma (cholera) and definitely identified it as the cause of cholera.

The rather high incidence of tuberculosis and leprosy cases in 1892 started del Rosario along the study of the genus responsible for these dreadful diseases. His research achieved for him the distinction of being the first to prepare and use the active principles of chaulmoogra oil in the treatment of leprosy. This was not less than twenty years before English or American scientists reported the value of such principles for leprous patients. Don Anacleto, with a humility and reticence characteristics of him, preferred to offer suffering mankind a remedy against a feared disease than to have his name publicized as the discoverer of a powerful drug. The City of Manila, however, rewarded his outstanding achievements in the field of pharmacy by granting him the Premio de la Faculty de Farmacia during the inauguration in July, 1886 of the Carriedo Water Works. He also won many awards in both national and international expositions. Among the latter were those held in Barcelona and Paris.
His enthusiasm and scholarly devotion to his scientific profession singled him out as a man of worth. This fact was recognized by others in the many positions offered him in both private and government institutions. The University of Santo Tomas appointed him professor of analytical chemistry. June 17, 1882 saw his appointments as Vocal farmaceutico (Pharmacist member) of the Comission of Health. On March 11, 1883 he became member of the Junta Inspectora de Bilibid, and two years later was named Farmaceutico municipal de Binondo. An appointment dated February 19, 1887 saw him inducted as member of the Commission de Valoraciones. For three years (1885-1888) he was the secretary of the governing board of the Manila prison. In 1891 he became secretary of the Junta Inspector y Administradora del colegio de Farmaceuticos. From 1891 to 1882 he was secretary of the Chamber of Commerce in Manila.

Del Rosario is undoubtedly one of the foremost bio-chemists and pharmacists our country has produced during the last century. His interest and work in analytical biochemistry make him one of the earliest Asians to work in a scientific discipline which during his life-time was still in its infancy. His main concern seems to have been to apply to local conditions his pharmaceutical and biochemical knowledge. His ability and inclination for scientific writing made him a popular figure in the national periodicals of his time. His love of reading his imagination his patience, and his determination to keep on at hard tasks played a large part in the triumphs he garnered during his short span of life. Although he never left his native land for studies abroad, Don Anacleto won the respect of his peers through his work with the test tube and the pen. Rightly may he be called the “Father of Laboratory Science.”

Del Rosario finally won the heart of the former Valeriana Valdezco and had three children by her: Jose, a chemist; Luis, archbishop of Zamboanga; and Rosa. It was his close contact with pathogenic bacteria that hastened his death and his reparation from his loved ones. He died a victim of tuberculosis on May 2, 1895.

NOTES

   This municipal laboratory created by a decree dated 13 September 1887, was put under the control of the Gobierno de Provincias. Its main functions were to conduct biochemical analyses related to public health, and to undertake specimen examinations for clinical and medico-legal cases.

28. His competitors were Don Gregorio Olea y Cordoba, a pharmacists and Don Francisco Lamberto Massip y Valls, a physician. Lorenzo Rodriguez, Filipinos in the pharmacy world, Phil. Pharm. Assoc. no. 1 (1958) 12.

29. This part of the examinations (known as the Ejercicio) del Raosario described under the title of Principios en que es funda el enalisis volumtrico y manera de preparer los liquidos titulados para el mismo. It was published in the official gazette. See Gaceta de Manila, tomo I. (1888). 134.

30. the governor General, Exmo. Sr. don Joaquin Jovellar y Soler, created that commission by a decree of 15 December 1884. The commissions president, as organized on 31 January 1885, was don Jose Centeno, a mining engineer, replaced later by don Jose de Vera y Gomez, a physician, Don Anacleto was a member of this royal commission.

31. (Los) Olores del Pasig ensayos micro-quimicos Manila); Establismento Tipografico de "La Oceania Española, 1866) 62 p.
33. Que estos cuerpos estan son verdades entototos pertenecientes a la clase de los Hongos, grupo Ascomicels y familia Discomicetes de bary y Genero y especie probable nuevios.
34. Laboratorio de Analisis Quimico y Microscopico: Tarifa de analisis (Manila: Establecimiento Tipo-litografia de M. Peres, Hijo 1887) 14 p.
35. Leche de Caraballa, Cronica de ciencios medicos, ano I. t. 1 (Sept. 1895) 75-0, Analisis de la Orina en ele beri-beri, Cronica de ciencias Medicos, ano t. l. (oct. 1895) 112-115.
36. The editors have high praise for his report on beri-beri: el mas tecnico y bien presentado de cuantos hemos referente al beri-beri... (Ibid., p. 115).
37. See Lorenzo Rodríguez, O.P. Chronicle of Philippine Pharmacy, Unidas ano. 28 no. 2, (1955) 2453.
38. The original paper in Spanish on ilang-ilang oil by Anacleto del Rosario was reprinted in the Journal of the Philippine Pharmaceutical Association volume 3 (1949) 431-438. an English translation by Dr. Patrocinio Valenzuela which is used here, appeared in same issue of that journal, pp. 439-446.
39. Ibid. p. 441.
40. Ibid.
41. Ibid., p. 445.
42. Marañon, Developemnt of phytochemical research, p. 377.
43. Don Anacleto has left a small diary entitled Mis Recuerdos bearing the date of March 7, 1880. See Jose ma. Clotet, S.J. D. Anacleto del rosario y Sales. Cultura Social, ano 11 (July 1914) 339.
45. Personal information from Dr. Jose s. del rosario.
46. In one of Rizal’s works el Filibusterismo, the personality of Anacleto del Rosario is alluded to in several chapters.
47. This was the maritime quarantine station of Mariveles.
48. This is the personal belief of Dr. Ariston Bautista as published in the Revista Filipina de Medicina y Farmacia, v. 21 (1929) 72.
52. He enjoyed verse writing to which he turned to while in bed during his last illness.

SCIENTIFIC CONTRIBUTIONS
1. 1879 Estudio sobre la unidad de las fuerzas fisicas, (Lecture delivered at the Liceo Artistico de Manila on November 22, 1879).
2. 1881 (Los) Ofidios venenosos mas communes del pais.
3. 1882 Analisís quimico de las aqaus minerais.
4. Analisis quimico de las aqaus minerales.
5. 1885 Apuntes sobre el Ilivan, Madrid.
7. 1887 Apuntes para el estudio de un Nuevo entofito. Manila: tipolitografia
8. Laboratorio de análisis químico y microscópico: tarifa de análisis. 
   Manila: Tipografía de M. Perez 8.1887.
9. 1888 Ejercicios: Principios en que se funda el análisis voluntario y manera de preparar los líquidos titulados para el mismo, Gaceta de Manila, tomo 1: 134.
10. Resultados de los análisis micro-quirmicos practicados en materiales reconocidos en la provincial de Manila, por la commission nombrada para el estudio de la epizootia.
Otto Schobl  
(1877-1938)

Dressed only in his pants and undershirt, the big husky scientist stood in silent observation while the experimental horses made their daily morning exercises in the front grounds of the Bureau of Science. I was a medical student of the University of the Philippines at the time, and Dr. Schobl and his experimental horses were a familiar sight to me.

This description of Dr. Schobl at work does bring to mind another great name in science, Otto von Guericke. Three centuries earlier, the latter also watched intently the performance of eight teams of experimental horses. But von Guericke’s horses had another task to perform – to prove the force of a vacuum by straining the horses’ energies to the utmost in trying to pull apart two empty metal hemispheres. Schobl had no spectators, save the curious passer-by on his way to work; von Guericke had the members of the Diet of Ratisbon to witness the experiments were to related to the health of a nation not his own, to a people he had come to serve from afar and to whom he would dedicate the best years of his scientific life.

Dr. Otto Schobl landed in our shores at a time when the country was faced by serious problems growing out of the ravages of tropical diseases. He soon realized the difficulties that challenged his professional skills and insights, but he did not turn back. Rather he threw himself wholeheartedly into the intensive study of cholera, dysentery, smallpox, plague, and typhoid. As the days turned into months he saw the need for research in immunology and vaccine therapy. It was therefore in these two fields that he was to make notable contributions to Philippine science.

Experimental work on yaws had already been conducted by Dr. Andrew W. Sellards and Dr. George R. Lacy. The former, of the Harvard medical School, worked for a year on the various phases of the problem of yaws in the Philippines, while Dr. Lacy had been assigned by the Rockefeller foundation to the biological and serum laboratories in Alabang. These studies were continued by Dr. Schobl and junior staff mostly from the aspect of immunity and superinfection. By 1927 his work on frambesia became the most noteworthy accomplishment of the Bureau of Science for that year.

The experiments on the etiology of the various clinical manifestations of yaws, as well as those an immunization against the disease began to evoke a clearer picture of the study under Philippine conditions. By then Schobl was able to offer an extensive and carefully-analyzed report (with thirty-two entries in its “References” that sought to solve problems on experimentally produced yaws which until that time had not been conclusively studied. The investigation sought the answer to three questions: 1) Do tropical yaws run a similar course in monkeys as in man, or can experiments induce such a course? (2) Is immunity to yaws possible in infected animals, and if so, how is this recognizable? (3) If such immunity exists, is it permanent or temporary? This study of Schobl extended the knowledge of experimental yaws and its immunity in animals to a point which corresponds with the then existing information concerning experimental syphilis and its immunity. Among his twenty-one conclusions are the following: 1) the Philippine monkey is highly susceptible to yaws and shows a variety of experimentally induced clinical lesions. 2) the yaws produced in that animal are clinically and automatically identical with that induced experimentally in human volunteers. 2) The Philippine monkey can be immunized against yaws, and this condition shows itself in
three ways – a) as resistance to superinoculation, b) as resistance to a generalization of the yaws process, c) a modification of the local and generalized lesions, 4). No amount of treatment will produce reinforcement in the animal once it has become resistant to yaws. Once the monkeys had reached this state of resistance, no spontaneous relapses were observed.

Earlier Schobl had already tried to clarify the nature of the disease both etymologically and clinically. In a note appearing in the official publication of the Bureau of Science he clarified certain misunderstandings arising from the use of popular names in describing clinical manifestations of yaws. The five printed pages of this “Note” are more of a supplement to the authors study entitled “Some protean manifestations of the skin lesions of yaws. This investigation done in collaboration with Sellards and Lacy revealed that the skin manifestations of yaws in human took in a variety of forms. Besides the typical granulation, at least three other types of exanthemas were identified. These were distinct types rather than different stages of one and the same lesion.

To further track down the infection through better clinical tests Dr. Schobl studied the globulin precipitation reaction in yaws and compared it with the Wassermann test. His investigations along this line showed that the globulin of the serum of a yaws-infected patient precipitates on dilution with distilled water but is not the carrier of the Wassermann antibody. Moreover, he found these two reactions to be independent of each other, as he and Basaca had already reported earlier for leprosy. As matter of fact, the globulin precipitation reaction with distilled water is positive a short time after infection and is pronounced in the pre-Wassermann stage. It maintains its strength throughout the course of the disease and shows positive values long after negative results are obtained by the Wassermann test. Schobl found the globulin precipitation reaction to be more sensitive than Wasserman’s as a prodromal and anamnestic reaction in yaws. The latter reaction is indefinite and ephemeral in the case of local yaws.

In an effort to arrive at new conclusions his scientific mind kept striving to correlate date and information already investigated. Serologically, as we shall discuss a little later, he sought to correlate yaws with leprosy. Similarly, new morphologic and biologic relationship between the spirochetes giving rise to yaws an syphilis suggested to him a comparison of yaws with syphillis in terms of capacity for superinfection. This was done using as experimental subjects six adults infected with yaws. Unlike syphillis, superinfection in yaws is possible. Unlike, syphillis, too, the papule develops into an oozing granuloma which gives rise to an amberlike crust.

Schobl studied further this relationship between yaws and syphilis together with the immunologic reciprocity between these two diseases. His earliest paper on this aspect of yaws appeared in 1929. Two years later he was still working on it. This part of his investigation together with confirmatory experiments led him and his co-workers to a better understanding of these two infections. Among the new findings were: (1) Immunologic reciprocity exists between yaws and syphilis, so that yaws-infected Philippine monkeys who were later immunized against it also became immune to cutaneous unoculations of syphilis. 2) The superinfection of yaws-infected monkeys with syphilis hastens immunity to yaws. 3) The findings made on monkeys confirm and amplify those made on humans. These proved that it is possible to attain immunity against yaws through repeated local yaws infection terminated by treatments. 4) Experiments confirmed a most striking effect – a vaccine of killed and harmless treponemas produced an immunity on the animals more rapidly and at an early stage of the
vaccination, while six months were required for complete immunity through actual
disease (local yaws).

Data accumulated and analyzed by Schobl from 1924 to 1931 on yaws and
syphilis yielded certain findings that extended to yaws the laws which Brown and Pearce
had applied to syphilis. These correlations of Schobl resulted in valuable contributions to
our knowledge of tissue immunity.

The first law of inverse proportion of Brown and Pearce was expressed by Schobl
(when applied to the course of Treponematoses) to be one of direct proportion between
the amount of treponematous antigen. And the degree of immunity as well as the speed
of its development.

Thus the law has a general application and van be finally formulated as
follows: The degree of subsequent immunity and the speed of the development
of immunity stands in indirect proportion to the amount of treponematous
antigen. Due to this direct proportion between the treponematous antigen and
the subsequent immunity, the immunity stands in indirect proportion to the
duration of the clinically active disease.

The second law of Brown and Pearce originally applied to syphilis was now
interpreted by Schobl as an immunity sequence developing successively in the various
systems of tissues, that it to say, the invading treponemas, long before immunity
develops, multiply and produce lesions only in those tissues not yet immune to them. Not
all tissues possess the same capacity to bring about immunity in treponematoses.

These experiments of Schobl and his assistants on yaws and syphilis added
greatly to the knowledge of the cause and treatment of these diseases. They represent
one of the glorious pages in the history of bacteriology in the Philippines and stand out as
one of the finest contributions to tropical medicine offered by the Bureau of Science.
However, many years of patient and unremitting study had preceded those medical
investigations that now offered him seep and intellectual satisfaction.

His birth place was in Zdice in far-away Czechoslovakia on August 27, 1877, a day
well-remembered by him and his closed friends. As events turned out, the enterprising
Otto was to acquire and share his scientific knowledge outside of his native land. In
1904 at twenty-seven the State University of Prague in Austria conferred on him the
doctrate in medicine. As an undergraduate he had been appointed assistant to the
teaching staff. After his graduation in medicine the young Dr. Schobl devoted three
more years in Austria acquiring practical experience in bacteriology and pathology. As
things turned out, these were the fields that brought prestige to his name as scientist.

In 1907 he decided to try his professional skills in the United States of America,
where he found his first employer, the H.K. Mulford company, rather satisfactory. The firm,
with headquarters in Philadelphia, was then one of the largest companies engaged in
the preparation of drugs and chemicals. It was there that Schobl acquired an intimate
knowledge of the manufacture of vaccines and sera, an experience he would put to
profitable use upon his arrival in the Philippines.

His first contact with this country was through the government’s Bureau of
Science. On march 18, 1912 he accepted the position of assistant pathologist in charge
of routine pathological and clinical examination. Soon after his arrival changes in the
handling of routine examinations in that laboratory were introduced. The work was
concentrated in two laboratory rooms close to each other and placed under the
supervision of Dr. Schobl. In the complimentary language of the Bureau’s Director, Dr.
Cox:

By placing these examinations in charge of a thoroughly capable
man who has all the work under his supervision and to whom all the
assistants are directly responsible, it is believed that greater efficiency and
accuracy will be secured. Dr. Schobl, with three temporary assistants, is at
present making all the routine laboratory examinations.

On April 1, 1915, Schobl having resigned from the Bureau of Science returned to
the United States of America. In New York he accepted a position in the State’s
quarantine Service. His own job did not prevent him from continuing the work on
experimental cholera carriers which he started in the Philippines in collaboration with Dr.
C.S. Panganiban. His stay in the United States was for only a year. In 1916 Dr. Schobl
resumed his work with the Bureau of Science as pathologist and bacteriologists.

Dr. Schobl’s work on cholera well illustrates his concern for Philippine diseases
requiring immediate solution. Soon after his first arrival in the Philippines a cholera
epidemic broke out. Many feared the recurrence of such a plague, and with reason
Many could still recall the deadly visit of cholera in August 1882. Then Manila and the
provinces of central Luzon witnessed the destruction of from fifteen to twenty thousand
victims during a six months period. At its height the epidemic caused as many as 1,300
death in a single day in the city of Manila alone. Bodies remained unburied for days
filling the air with their stench. A battalion of soldiers helped bury the dead, en masse, in
a common pit.

Schobl’s second published research in the Philippine Journal of Science is entitled
“Bacteriological observations made during the outbreak of plague in Manila in 1912. For
this he studied patients, blood sucking insects in infected areas, rodents and domestic
animals suspected of plague infection. He utilized human blood cultures as a valuable
tool for clinical diagnosis of the epidemic. Of the twenty-four patients studied the
materials collected from the bubos yielded a higher percentage of bacterial culture
than those obtained from the blood. The lowest percentage of bacteria was gathered
from the patient’s skin and sputa. The Bacillus pestis was found in the patients circulating
blood, even in those who subsequently recovered although the period of time during
which the bacillus circulated in the blood stream was short and irregular. His analysis of
Manila waters revealed an unexpectedly long period of vitality of the cholera vibrios in
tap water, and pointed to the possible introduction of Asiatic cholera from port to port
by water carried on board the ships. Some years later he conducted an experimental
study of the bactericidal activity of drugs on cholera vibrios as part of his effort to look
for a remedy against the disease and to evaluate intestinal antiseptics. He found
phenolic and arsenical compounds to be effective, although none of the chemicals
tested produced the complete disappearance of a cholera vibrios.

His last reported study on the topic of cholera dealt with vaccination against it.
His initial investigation of 1912 had shown that the plague injection was transmitted by
fleas, particularly through rats, and that domestic cats played an important role in
spreading the disease. Natural plague infection in cats found dead in warehouses gave
bacteriologically positive results. In 1925 his interest centered in evaluating the
effectiveness of the anti-cholera vaccine used in the Philippines, and in finding out when
revaccination were to be made under local conditions. In this study he indicates the advisability of completing wholesale vaccination at least one month before a cholera epidemic may reasonably be expected to occur. He was, of course, referring to areas where the outbreak was a yearly occurrence.

Schobl's work with Panganiban on cholera carriers as well as his laboratory testing of germicides elicited the following praise from a Filipino scientist:

> Otto Schobls experiment on the treatment of experimentally induced cholera—carriers is an ingenious work, showing a new approach of experimental therapeutics. His work on germicides (1929) is classical; it points out the pitfalls one should avoid in transferring the results of laboratory experiments to the practice of medicine...

Schobl's undertook the study on germicides in view of the different results obtained by Reddish and Drake as well as by Simmons on the bactericidal action of merucurochrome which had then brought some distrust of laboratory tests on germicides. On the other hand, clinical observation had consistently verified the biological laboratory reports on the efficiency of chaulmoogra oils and similar drugs. In the discussion of this problem Schobl pointed out that merucurochrome and iodine were tested on only one organism and following one procedure alone, while the chaulmoogra oils and similar drugs were tried on six organisms by four different methods or assay before concluding on the superiority when compared to merucurochrome. This incident gives us an indication of the impatient solicitude of his scientific mind for accuracy and well-substantiated experimental results.

Dr Schobl's interest in chaulmoogra oil, however, was not restricted to its germicidal property. Years before, he had pursued some investigations on it as part of his interest in leprosy. As a matter of fact, his laboratory work during the latter part of 1923 and throughout the following year gravitated mostly on some aspects of leprosy, which the time was a disease of some concern to scientists and physicians in the Philippines. As an active member of the Philippine Leprosy Research Board he conducted a series of experiments to evaluate the efficacy of chaulmoogra oil and its derivatives as chemotherapeutic agents against acid-fast bacilli. The first experiments showed that his oil had a pronounced and specific growth-inhibiting effect on bacillus tuberculosis in vitro.

He also found other vegetable and animal oils which produced the same inhibitory effect on those bacilli in vitro, although not to such high dilution levels as obtained with chaulmoogra oils. Volatile oils, however, of chaulmoogra showed no disinfecting effects on B. tuberculosi and four other types of acid-fast bacteria. Dr. Schobl then extended this aspect of his research to include other organic compounds and found, for instance that unsaturated alcohols, hydroxyl compounds and phenols (especially alkylated on the ring) showed an antiseptic effect toward acid-fast bacilli. As to the growth-inhibition of microorganisms, these were: (1) the glyceryl rather than the acid part of some vegetable oils are important. (2) the structure of the ring of the fatty acids influences that inhibition; and acid-fast bacteria adapt themselves to acids from chaulmoogra and then are able to withstand larger doses than originally given.

Dr Schobl's leprosy studies in 1924 concluded with a paper explaining a technique devised by him and his assistants to identify leprosy in human serum. Up to that time, the Wassermann reaction was the main serological method for leprosy cases. In the
absence of a specific reaction in leprosy this research team worked on the behavior in
leprosy of a reaction which was not concomitant with the Wassermann or other serum
tests, that is the globulin-precipitation on dilution with distilled water of the globulins form
the fresh serum of the patient. Precipitation disappeared on inactivation or long standing
of the sample. Schobl's globulin-precipitation technique gave positive results in 100
percent of the lepers studied while the Wassermann reaction was positive results for all
cases of leprosy, even those presumably cured. In cured cases, however, the test,
although positive was less pronounced with in the active cases. When applied to
healthy non-lepers the test was negative. No definite explanation however, was given
by Schobl and Basaca for the chemical mechanism responsible for the reaction.

Some bacteriological aspects of dysentery also attracted Schobl's interest
although from the published papers it seems than he did study them on and off
depending on the demands of more pressing work, and as is usually the case with
scientific researchers, as possibilities suggested by the main task of the moment. In
1919 he co-authored with Panganiban a report which offered a bacteriological
diagnosis of bacillary dysentery through the application of methylene blue-eosin lactose
agar as a medium. The authors used for B. dysenteric the medium already found effective
by Holt-haris and Teague for Bacillus typhosus. The diagnostic technique presented was a
considerable improvement over the lactose litmus plate method. A number of years
later Schobl and Villaamil published a study on the agglutination of B. dysenteric offering
a technique for the classification of its Shiga strain. This serologic grouping based on the
quality of antigen and normal agglutinins agreed remarkably well with that of Lacy
which depended on the agglutinogenic property of the same strain.

Eleven years after Schobl's report of a diagnostic test for dysentery bacilli a more
extensive one appeared which presented the conclusions of a study that lasted one
whole year. He worked on that particular project to help reduce the baneful effects of
the endemic nature of this disease in the Philippines. The authors offer in the report a
revised technique of the isolation and diagnosis of the bacillus based on the principle of
elimination. The project required the search for B. dysenteriae \ B. typhosus and B.
paratyphosus in 24, 251 individuals. The technique of Schobl and B. Villaamil shows that:

Besides the number of specimens which were positive on both
preliminary and confirmatory tests. On the other hand, however, none
was found negative in the preliminary tests and positive in the
confirmatory test. So the error of the procedure here discussed lies on the
safe side.

A scientific incursion into the pathology of pneumonia offered him the
opportunity of solving one aspect of the problem of experimental pneumonia, namely,
the bronchogenic origin of both lobar and bronchopneumonia. But more important still,
the investigation contributed not a little to the knowledge of the pathogenesis of
pneumonia in man, and displayed once more his dexterity as an experimental scientist.
The study disclosed that monkeys develop pneumonia after the intertracheal inoculation
with one cubic centimeter of a young broth culture of a pneumococcus type that is
highly virulent to mice. The histological picture of this experiment made it clear that the
pneumonia
Produced was of a bronchogenic origin. Schobl, found out, however, that the Philippine
monkey was not very susceptible to the pneumococcus when tested in the tropics under
conditions closely resembling the animal's natural habitat.
Dr. Schobl’s last extensive scientific report in the Philippine Journal of Science dealt with the problem of rat-bite fever. The paper was supplemented with ten plates and eighteen text figures. This disease had been endemic in Manila for more than twenty years. This first full report on the subject, although not exhaustive, gives a good picture of the Spirochaeta morsus murs, its biology and important aspects of its immunity, hematology, transmission and the chemotherapy related to it. Eleven strains of the spirochete were isolated from Manila residents. The authors point out that the foci of greatest danger in a rat-plague infestation of Manila are the port Area; the Solana-Cabildo-Potenciana-Anda blocks in Intramuris; San Nicolas, particularly along Santo-Cristo, San Fernando, and Del Pan Streets; Tutuban Station surroundings, and those of the Quiapo and Paco markets. These districts were chosen after a comparison of the distribution of human plague cases in the same city during the years 1912-1914. In both instances there was complete agreement as to the districts affected by the plague and those affected by human rat-bite fever. The report concludes with a plan of attack against rat-plague and a tentative prediction of the progress of such a plague in the city of Manila. It may be of interest to corroborate that prediction of foci maximum danger were a place to occur in Manila in our own times.

From the year of his return to the Philippines in 1916 until his retirement twenty years later Dr. Otto Schobl was in charge of the Serum Section, later called the Division of Biology, of the Bureau of Science. The Serum Laboratory was one of the main divisions of the original Bureau of Government Laboratories, which in 1905 became the Bureau of Science by virtue of Act No. 1407. One year later its Serum Laboratory was transferred from its original site on the ground floor of San Lazaro Hospital to the campus of the Bureau of Science in Herrera Street. In 1916-17 a small concrete laboratory was built as an annex to that laboratory, providing it with a separate bleeding room and two small isolated rooms for work requiring the minimum of bacterial contamination. There was also space provided for the preparation of smallpox vaccine. By 1918 the Philippine Legislature appropriated two hundred thousand pesos to set up a modern serum laboratory outside of Manila. The site finally chosen was the unused portion of the stock farm of the Bureau of Agriculture at Alabang, Rizal.

Much credit should be given to Dr. G. Apacible, ex-Secretary of Agriculture and national Resources, for establishing and equipping that serum laboratory at Alabang. It was, however, Dr. Schobl who was instrumental on the scientific level, for the organization framework and supervision that enabled the laboratory to undertake the large scale manufacture of biological products. This standard products manufactured in the serum laboratory included items like antitetanic serum, antidyseric serum, normal horse serum, vaccine virus, cholera vaccine, typhoid and paratyphoid vaccine, dysentery polyvalent vaccine, gonococcus vaccine, staphlococcus albus and aureus vaccine, streptococcus vaccine, and antirabies treatment. Hence, it is but a fitting tribute to state that Dr. Schobl played a valuable role, through his scientific investigations and his supervision of those biological products of the Bureau of Science, in eradicating from our shores dreaded epidemics like cholera, dysentery, typhoid and smallpox. In fact, until an adequate supply to standard killed vaccine, against smallpox for instance, became available from the serum laboratory, this virus diseases claimed the lives of at least 40,000 Filipinos yearly. But with systematic vaccination conducted throughout the archipelago the mortality from that and similar diseases was reduced to comparatively low numbers.

Both the quality of Fr. Schobl’s scientific achievements and of his character won for him the admiration and respect of those who knew him. His sincerity and
unpretentious behavior, his stomach devotion to work and his tactful manners made it easier for his subordinates to comply with this requests.

As head of the biological laboratory, Dr. Schobl never interfered in the performance of our experiments. He respected the individuals right to work in accordance with his physical and mental capacities. Silently, but keenly, he observed our work and was thus able to assign each of his assistants to a particular phase of an experiment which was best suited to him. 

Dr. Schobl exemplifies traces of a great teacher who inspires but does not overwork, who with patient and unobtrusive care guides each one of his charges to the heights of excellence within the individuals cultivated abilities. His days were always crowded with experiments to supervise, reports to edit, scientific literature to study, consultations to attend to, scientists to meet that not much time or concern was left for his social activities. As one of his former trainees recalls, He preferred to spend his Saturday afternoon napping in the restive coolness of the Ideal Theater.

Dr. Schobl’s association with the Bureau of Science resulted in a symbiotic relationship that ultimately benefited the Filipino people’s while also enriching his own personal life. His work with the Bureau of Science enhanced that organization with a good number of the eighty-four scientific articles written by him; strengthened its links with foreign centers of learning through his knowledge of English, Spanish, German, Japanese and Czech; and eventually added one more name to its roster of outstanding men o science. Schobl, on his part, developed the greater part of his scientific skills and scholarly scientific style during his twenty-three years with the Bureau of Science. Together the man and the institution have left for posterity a proud heritage of fundamental work in bacteriology and pathology of much value to the scientific and socio-economic development of the Philippines.

Even during his own lifetime the Philippines acknowledged its gratitude to so beloved a European scientist who well-deserved to be counted among its adopted sons. In 1918 he was elected President of the Manila Medical Society. For many years he was a member of the editorial board of the Philippine Journal of Science, a publication he also enriched with his many and scholarly contributions.

In the end, such an intense dedication to the many demands of both his administrative and research tasks affected his health. On the advice of his physicians he left for Tokyo for a change of environment. But this did not materialize until his retirement from the Bureau of Science. Nevertheless, he was accustomed to so much intellectual and physical activity that soon after his arrival in Japan he accepted a teaching position at the Empress College of Medicine for women. It seems that Dr. Schobl’s solicitude to out every moment to good use would not allow him to frible away his time.

His choice of Japan as a place to recover his physical energies was not a decision made all the flip of a coin. That country had quite an attraction for him and was an important link to his personal and scientific life. He had taken a Japanese wife and adopted a son a Japanese Medical Corps. As a scientist he had great admiration for his Japanese colleagues. More than once his scientific researches had been carried out in collaboration with Japanese investigators and he had made visits to their country. The Japanese Government paid tribute to those scientific accomplishment by awarding him to Order of the Rising Sun, fourth class in recognition of
his investigations on yaws carried out in the Philippines but with the cooperation of Japanese researchers. This was indeed a district recognition which was accorded to only a few presidents of Japanese universities even after twenty years of distinguished service to their government.

Dr. Schobl visited Japan in 1923 as a member of the Philippine Relief Mission, and accomplished his assignment so successfully that he was highly commended by the American authorities. In appreciation for his humanitarian services the following letter was sent to his superior, the Director of the Bureau of Science:

Abroad the U.S.A.T. “Somme”
October 22, 1923

The Director
Bureau of Science
Manila, P.O.

Sir:

I desire to make a record the very valuable services rendered by Dr. Otto Schobl, of the Bureau of Science, as a member of the Relief Mission from the Philippines which recently brought assistance to the devastated areas of Japan.

Dr. Schobl has at all times been most willing and efficient. He was volunteers for unfamiliar duties and has carried them out with the same fidelity and success that characterizes his professional work in your Bureau. Of attractive personality, he has endeared himself of all members of the Relief Mission. His knowledge of Japan and of the Japanese language has made this advice and his services as interpreter of great value.

I desire to invite favorable consideration of doctor Schobl’s services as above, and request that this letter, which has been prepared without his knowledge be filled with his official record.

Very respectfully,

(Sgd) E.L. Munson
Colonel, medical Corps, U.S.A.
Chief, Surgeon Japan Relief Mission

As might have been his wish, on October 13, 1938, Otto Schobl died in Japan, the land of his adoption. He was then sixty-one years of age. The Bureau of Science, on behalf of the Philippines paid tribute to his scientific achievements through the pen of Sr. Quisumbing then acting Director of the Bureau of Science.

Dr. Schobl’s colleagues in the Bureau of Science are very sorry to learn of his death. Considering the inestimable value of his researches on tropical medicine and the significance of the biological products which were improved under his supervision and which are mainly responsible for the eradication of epidemics such as cholera, dysentery, smallpox and typhoid. Dr. Schobl’s passing is a great loss to the Philippines in particular and to the scientific world in general.
In the annals of the history of science in the Philippines this is indeed a humble tribute for a great man.

Notes

1. Personal information from Dr. Joaquin Marañon.
2. The illustration is taken from Guerike, Otto, Von, Experiments nova Magdeburgica de vacuo spatio (Amsterdam, 1620) as reproduced in History of Science; the beginnings of modern science, ed. By Rene Taton (New York: Basic Books, Inc.) p. 257.
3. Immunology is that branch of medical science dealing with immunity from disease and the production of such immunity.
4. Yaws or framboesia is a contagious skin disease resembling syphilis, prevalent in certain tropical regions, particularly in the Antilles and in Africa. It is characterized by yellowish or reddish lesions or excrescences on the face, hands, feet, and genitals which in shape and appearance often resemble raspberries. Strawberries or currents disease is of long duration.
5. Superinfection refers to infection following another, or to inoculations at various time intervals. See, William H. Brown, Twenty-fourth annual report of the Bureau of Science, January to December 1925, Manila p. 12.
7. Reinfection refers to repeated inoculation so that each individual infection terminates with a specific treatment before death due to infection occurs.
9. Protean in this context refers to the various forms and clinical manifestations of this disease.
11. Exanthem is a skin eruption or rash occurring in certain infectious diseases.

The Wassermann test in a diagnostic reaction for the presence of syphilis by determining the existence of antibodies in the blood serum to Treponema pallidum, the causative organism of the disease. It was described in 1906 by the German bacteriologist and physician Augustus von Wassermann. The Wassermann reaction is not completely specific. It may be positive in yaws, and occasionally in leprosy as the experiment of Schobl showed.

14. Prodromal means forerunner or a warning sign indicating the onset of a disease.
15. Anamnestic refers to that which is related to or aids recall.
cure for yaws in the compound dioxyamido arsenobenzol, first used against fowl spirochetosis and syphilis.

17. Papule is a small, usually inflammatory, elevation of the skin.
18. Granuloma is a morbid infective growth whose tissues resemble granulatins.
20. Otto Schobl Coexistent infection with yaws and syphilis.
22. Otto Schobl “Experimental study of immunologic reciprocity between yaws and syphilis considering also other phases of immunity besides the complete resistance to infection,” Philippine Journal of Science, 42 (1930), 239-250; the Immunologic effect of antitreponematous vaccine therapy administered after specific treatment which was given in the early stage of initial local yaws in the Philippine monkeys,” Philippine Journal of Science, 43 (1930) 603-609.
23. Otto Schobl The immunologic effect or repeated yaws infections interrupted by specific treatment given in the early stage of initial yaws, Philippine Journal of science, 43 (1930) 589-594.
24. Treponema is a genus of protozoan organisms parasitic in the blood and tissues of animals. T. palladium is the agent of syphilis, while t. pertenue that pf yaws.
25. The first law of Brown and Pearce, that of inverse proportions states that in the cases of syphilis the more intensive the early manifestations, the less intensive become the late manifestations of disease. Their second law is that of sequence – the serious tissue systems are affected successfully by a disease like syphilis. In human syphilis, for instance the integument the internal organs, the cardiovascular system, and the central nervous system are successively affected.

Scientific Contributions

7. 1916 Plague. Its causes and the manner of its extension, its menace, its control and suppression, its diagnosis and treatment, by Tomas Wright Jackson, with bacteriologic observations by Dr. Otto Schobl, Philadelphia, Lippincott 191 p.
8. 1917 Influence of bile upon the duration of the state of cholera carriers in experimental animals. Philippine Journal of Science. 11B. 157-158.
14. 1925 Chemotherapeutic experiments with chaulmoogra and allied preparations
   Transaction of the Far Eastern Association of Tropical Medicine (Tokyo, Japan). Sixth congress. 2: 745-748.
26. 1936 Effect of bile on the viability and general biology of intestinal pathogenic bacteria, by O. Schobl and others. Philippine Journal of Science 59:149-161
27 1937 Verusche nit tuberkelbazillen uber die zeitliche und
Marcos A. Tubangui
(1893-1949)

Not infrequently do we discover erudition that is profound in a sincerely self-effacing personality. One example of this happy blend of qualities is Dr. Tubangui. Those who shared with him many working hours were very much aware of his reluctance to have even his praiseworthy achievements become the topic of conversation. Casual and admiring acquaintances too, found this out soon enough. His family enjoys recalling the incident involving three American scientists. They were in Manila and were eager to exchange ideas with Dr. Tubangui. To make sure that they found some quiet time with him they came to his office at seven-thirty one morning. An office door opened and they noticed that a Filipino was just finishing the routine tasks of opening windows and sprucing up the place. Would you please show us the office of Dr. Tubangui? Quiet employee pointed out the visitors the name plate on the corridor door. They sat down and waited for some time. Meantime their silent friend had gone. Soon another Filipino stepped into the room. He had the appearance of a janitor. Is Dr. Tubangui in now? Yes, you may come in? As they came into the office surprise shone in their eyes. Dr. Tubangui was that quiet-looking Filipino they had first met at seven-thirty. When chided by his wife, later on for not introducing himself to so distinguished guests, he replied with a humility devastating in its logic: Why should I? they didn’t ask me who I was.

Tubangui’s reserve was equaled by his strong sense of service. Not only did he avoid anything that might hurt others, but he would go out of his way to be of help to them, at least through that respect and politeness so spontaneous in his conduct. Even at home, he would not let the house help do things for him if he could do them himself. Towards his subordinates in the laboratory, he was most patient and understanding. Service to them meant that he would encourage them in spite of their failures and shortcomings. When one of them erred in his work he was sure to hear from voice. It’s all right. Everyone makes mistakes. This forbearance did more to improve efficiency at work than many frowns could have done.

To these lovable qualities were added others that brought out his deep sense of duty. Time was for him a precious gift, and he saw to it that it was profitably used. When not engaged in laboratory investigations or administrative work he would read or write. At times, though, he would play bridge with a few of his close friends. Among these bridge companions were Don Pedro Guevarra, University of the Philippines Presidents Palma and Tan, and even commonwealth President Quezon himself. But as Dr. Tubangui once confided to his assistant, Miss Masilungan, he did not really enjoy playing with Don Manuel. He was such a great personality that he felt ill-at-ease with him.

Nevertheless, this mild-tempered, soft-spoken, unobtrusive man did carve out for this country a place of honor in the annals of parasitology. In the history of science in our country this field was still unheard of as an independent scientific discipline when the Philippine Medical Association was formed on September 15, 1903. Among the American physicians working in our country at the beginning of the century, no one had previous field experience in tropical parasitology. But the various tropical diseases they encountered not a few of which displayed parasitological aspects, compelled those surgeons, sanitarians, pathologists, and bacteriologists to include the study of parasitological problems as part of their medical investigations. It was indeed with a
sense of joyful relief that they heard, by the second decade of the century, that the name of a Filipino scientist was closely linked to work on parasitology.

In terms of Philippine medical parasitology, Dr. Tubangui's most outstanding contribution was his discovery of the complete life cycle of the Emparyphium ilocanum. The nature of this cycle, a key in effectively combating the parasitic organism was reinvestigated in the early thirties in an effort to obtain efficient means of preventing the spread of the infestation. This intestinal parasite of man was discovered in the stool of an inmate of the Bilibid Prison and in 1903 Garrison labeled this the Fascioletta ilocana. The aptness of its specific name was confirmed when nine years later Hilario and Wharton reported it to be common among the inhabitants of northwestern Luzon. In 1913 he and his coworker Pasco were able to report on the complete life cycle of the trematode. According to the findings, the eggs when in the one-cell stage were present in freely passed stool and reached the miracidia stage in water at a room temperature from 26o to 31o C. After six to fifteen or more days the miracidia hatch, which is three or four days begins to escape from experimentally infected snails forty-two to fifty days after the latter's exposure to the miracidia. The life cycle showed that the organism uses two freshwater snails as intermediary hosts. The first host is a small fresh water snail, Gyraulus prashadi (Faustino) in which the larval stages are developed. The second intermediate host may be any of our common fresh water snails, including the primary intermediate host itself. More often, though it is the common ampullarid cuhal (Pila luzonica). The cercaria encysts in that type of aquatic form and becomes infective. In the case of the E. ilocanum the infection was found to be transmitted to humans by ingestion of the cyst-bearing snail in raw or insufficiently cooked state, as is customary in the Ilocos region. As a prophylactic measure, Tubangui recommended educating the folk people in the proper disposal of their faeces and cautioning them against eating raw or half-cooked snails.

One of the greatest scourges of the Far East has been the parasitic disease known popularly as snail fever, or schistosomiasis. It is caused by infestation with the blood fluke belonging to the class of the flatworm and genus Schistosoma. Earlier, Schistosome eggs had been discovered in the kidneys of such ancient remains as Egyptian mummies, a fact which testifies to the antiquity of this disease. Three Schistosoma species are parasitic to man, and of these the S. japonicum was found to occur in Japan, China, Formosa, Celebes, and the Philippines. This latter form of schistosomiasis was first reported in the Philippine scientific literature by Wolley in 1907. By the time Dr. Tubangui started his professional career as a parasitologist in 1922, Mendoza-Guazon noted the prevalence of schistosomiasis in the islands of Leyte and Samar where it became a serious public health problem. Then the health hazard was compounded by the fact that the intermediate host of the parasite has not yet been detected. In 1932, Dr. Tubangui decided to delve deeply into this matter. He spent April and May of that year in the province of Agusan and Surigao conducting parasitological surveys. His observations indicated that the small amphibious snail known as Blanfordia quadrasi abounded in quiet waters like rice fields and that 50 per cent of the farmers in those localities were suffering schistosomiasis. Moreover, he noticed that a large percentage of the snails collected from these two provinces showed the presence of the characteristic schistosome cercariae.

Dring the early part of that same year Dr. Tubangui, together with Mr. Andres Celestino and Mr. Simplicio Garcia of the Bureau of Science, spent a month at Palo and nearby towns of Leyte where schistosomiasis case had also been reported to the medical authorities. The investigations made in this section of the Visayas and in
northern Mindanao gave him enough clues to be able to report that same year the discovery of the small snail that harbored the effective larval stage of the *S. japonicum*. The culprit was identified as the Island fordia quadrasi. In his report he likewise showed that the larva of the parasite gained entrance into the human body through the intact skin. With the identification of the host snail, much of the battle against schistosomiasis was won. Killing the snail found in rice paddies, irrigation canals, and small brooks would break the life cycle of the parasite and help eradicate the disease. The application of live heat from a blow torch was found to be a simple and economical way of disposing of the intermediate host.

But the struggle against schistosomiasis was not over. To be able to formulate concrete plans towards its complete control and ultimate eradication, more information was required about the life history and binomics of the snail. Fr. Tubangui even amid other parasitological investigations, kept his eyes open for more insights into the life of the *S. japonicum*. Shortly before the outbreak of the Second World War he published two studies about its distribution and control. These two reports represented years of research on the parasite. Recognizing the value of Dr. Tubangui’s research on schistosomiasis, the National Research Council of the Philippines in 1939 awarded him a grant-in-aid of five hundred pesos.

During March to April of 1938, Dr. Tubangui organized a survey party to work in Samar, Leyte, Mindanao, and Mindoro. Seven years earlier they had discovered that some of those areas were infested with the parasite. One of the most important results obtained from this survey was the detection of an endemic focus in Naujan, Mindoro, where schistosomiasis was not expected to occur. This discovery made Dr. Tubangui realize that the infection was more widely distributed in the Philippines than was formerly known. By the end of that summer of 1939, Dr. Tubangui could report that five provinces or islands of the Visayas and Mindanao were definitely infected. These were Samar, Leyte, Mindoro, Agusan, and Surigao. All together, the area harbored almost two million Filipinos, and five percent of them were victim of schistosomiasis.

Not uncommonly a research scientist’s line of work is suggested by the turn of events. We have an example of this in Dr. Tubangui’s career. In the course of his epidemiological survey on human schistosomiasis in April of 1938 in northwestern Mindanao he observed that several faecal samples from individuals living in a barrio of the two of Mainit, Surigao, contained parasitic forms. Microscopic examination revealed the presence of trematode eggs that closely resembled the ova of the *Echinostoma ilocanum*, the parasitic he had found in northwestern Luzon. Further inquiries showed that the areas bordering Lake Mainit abounded in ampullarid snail, *Pila ampullaceal*, which the people used as food. Dissections of the samples of the mollusk showed the presence of encysted larval trematodes (*Echinostome metacercariae*) in its gills. When the mollusks was fed to white rats and monkeys the trematode was found to develop into an adult fluke with eggs similar to those which had been found in human faeces. These feeding experiments showed one way by which humans could acquire the parasitic – through the consumption of the raw or insufficiently cooked snail, *Pila ampullaceal*. This Surigao trematode was a new human parasite brought to light through the studies of Dr. Tubangui and was named after the two where it was first noticed – *Echinostoma ilocanum* in man respects, but is distinguished from the latter by such important anatomical features as the number, size, and arrangement of the cephalic spines.
Another fluke-caused disease among Filipinos drew the attention of Tubangui during the last decade of his life, the paragonimiasis. The infection is due to a fluke which lives in pockets of the human lungs. Its symptomatology includes chronic cough with production of blood-stained, rusty-brown and purulent sputum, causing it to be sometimes mistaken for tuberculosis. This human lung fluke was known in the Philippines as early as 1907, but its manner of transmission was a mystery. However, one datum to work from was available to him, that in China, Japan, and the United States, a very closely allied parasite uses certain kinds of freshwater snails and crabs or crayfishes as primary and secondary intermediate hosts. Tubangui and his associates set their investigation toward Naga, Camarines Sur, a supposedly endemic region. A variety of snails, crabs, and crayfishes were collected from small streams and creeks near the foot of Mount Isarog. No larval stages of Paragonimus were discovered in the snails and crayfishes but a large number of the crabs (Potamon) were found to harbor the infective stage (metacercaria) of the parasite in their muscles and liver. When the fresh meat of these infected crabs were fed to laboratory rats and bats the metacercariae developed into adult Paragonimius in the lungs of the experimental animals. At this stage of the investigation Dr. Tubangui concentrated on the morphology of the adult worm so as to establish the specific identity of the parasite.

With the return of peace, Dr. Tubangui resumed this line of research and at various intervals from February, 1948 to June, 1949 he conducted a series of field trips in various parts of Sorsogon and Camarines Sur in an effort to complete the existing body of knowledge on the life cycle of the human lung fluke in the Philippines. He was specially interested in identifying accurately the intermediate host involved in the transmission of the parasite. Studies conducted during the first month of the survey confirmed his previous findings that the river crab Parathellphusa (Barythelphusa) mistio harbored the infective metacercarial stage of the parasite. But an examination of hundred of different snails for the presence of the younger larval stages yielded negative results.

A second field trip to Irosin, Sorsogon in May of 1948 brought in a total of 3,002 snails that were found to belong to five different species. Their long and meticulous dissection and examination yielded once again negative results. This was quite disappointing since the team during that rip had given special attention to the snail Thiara (Tarobia) granifera. This species had been previously identified as one of the intermediate hosts of the Paragonimus westermani; and was responsible for endemic paragonimiasis in China, Korea, Japan, and Formosa. A third trip was organized form January to February of 1949 to the same area and with the same precautions. For a third time their efforts as isolating the larvae proved useless.

Undaunted and now spurred by the challenge of a blank wall, Tubangui started on a fourth trip that lasted from June 9 to 12, 1949. Finally nature released its secret to so persistent endeavors. In a mountain stream of Barrio Mabini in Casiguran, Sorsogon, a total of 1,986 snails were collected and each examined for the presence of the larvae. Tubangui and his associates sighed in relief when two snails out of almost two thousand were found to harbor the cercariae and other larval stages of the paragonimus. This one-tenth of a percent missing piece completed the jigsaw puzzle. Tubangui felt then that the complete life-cycle of the lung fluke in the Philippines could be traced. The snail known locally as tabaguang was identified as the Brotia asperata. In some localities in South Central Luzon this edible snail was called barogan.

The problem of hookworm infestation among adult Filipinos interested Dr. Tubangui in his early years as parasitologist. Three of his first five scientific studies were on
various aspects of the parasitology of nematodes. In 1935 with the help of Dr. Basaca and del Rosario, he conducted a rather extensive quantitative survey of hookworm infestation in the Philippines. His objective was to give a plausible explanation for the current but varying opinions regarding the medical significance of hookworm attacks in the archipelago. Ten widely separated geographical areas were selected for the study and a total of 2,357 individuals were examined from hookworm infection. The population was distributed as follows:

- Manila 503
- Paombong, Bulacan 401
- Cabuyao, Laguna 116
- Las Piñas, Rizal 315
- Baab, Camarines Sur 220
- Masbate, Masbate 56
- Pardo, Cebu 489
- Palo, Leyte 169
- Catbalogan, Samar 34
- Cotabato, Cotabato 54

The individuals examined in the Manila area were school children from seven to eleven years of age, while those examined in the other localities represented mixed populations.

The egg counts indicated an uneven distribution of hookworm infestation, showing higher values for both incidence and intensity of the parasite in the populations of Camarines Sur, Cebu, Leyte, and Cotabato, than the other six localities. Moreover, the reduced hemoglobin percentage of hookworm victims in these four provinces and high egg counts of ten thousand or more per cubic centimeter of faeces confirmed the fear of prevalence of the parasite in those areas. These discrepancies in the habits of the people since all the places visited Manila excepted used primitive methods of waste disposal, with the large majority of individuals studied going habitually barefoot and engaged mostly in occupations favoring hookworm infection.

Tubangui and his associates explained such differences to be due to climatic and other environmental factors that affect the temperature and the moisture content of the soil. The varied distribution of rainfall throughout the archipelago strengthened this opinion. In some localities two pronounced seasons were usual, half the year being dry and the other half wet. Other places with an even annual rainfall distribution experienced very short dry periods, like the provinces of Camarines Sur, Cebu, Leyte and Cotabato. If one were to add to these places the existence of covering vegetation in the neighborhood of human habitations then one had a condition that would prevent too rapid evaporation of ground water. Such moist but sufficiently warm soil during the greater part of the year was conducive to the growth of hookworm larvae.

On the other hand, localities like Manila, Bulacan, Rizal, and Laguna with two pronounced wet and dry seasons and the absence of covering vegetation discouraged the spread of the parasite. This would explain the comparatively light incidence of the infestation in these provinces. Tubangui also pointed out in this study that the early investigators in medical zoology had underestimated the importance of hookworm in the Philippines for two reasons. In the first place most of them had carried on their observations in Manila and the neighboring provinces. Then too, the relatively light incidence as well as slight clinical importance of hookworm diseases in such localities gave them a false picture of the degree of infestation for the rest of the Philippines.
Two other intestinal worms also common in warm areas with moist soil are the Trichoccephalus trichiurus responsible for trichocephaliasts or whipworm infection and the Ascaris lumbricoides which is the large intestinal roundworm likewise prevalent in our country. While studying the anthelmintic efficiency of hexylresorcinol against hookworm and other types of human parasites, Tubangui offered valuable observation on their distribution in the Philippines and the intensity of their infestation. In a mixed population the incidence was higher and the degree of infestation was heavier in children up to fourteen years old than in adults (fifteen years and over). Ascaris was likewise more prevalent and greater in females of child-bearing age than in males of corresponding age. The trichiuris parasite, however, had practically the same age and sex distribution in a mixed population as the ascaris.

He further observed that the trichiuris infestations were much greater in individuals living in places with an even yearly rainfall and vegetation that kept the ground moist while no such significant variations were noted in the intensity of infestations due to the ascaris. He explained this in terms of the biology of their ova. Those of the ascaris were very resistant to unfavorable external conditions, while those of tricuris were easily destroyed by desiccation. He had already appointed out that in the case of the vegetation had much to do with its distribution in the archipelago.

Ascaris infestation in the Philippines was ascribed by Tubangui as due mainly to soil pollution in the vicinity of human habitations. This danger was greater in areas where children of pre-school age were present. He stressed the need for controlling, specially in crowded communities, soil pollution through the use of sanitary facilities and doing away with the practice of the promiscuous defecation of children.

In connection with the anthelmintic value of the drug hexylresorcinol we note that Dr. Tunbangui had administered this to a total of 861 persons of both sexex of different ages. No important symptoms of intoxification were noted, and the results of the treatment showed that under field conditions it was a safe anthelmintic to use. Its efficiency ranged from 82 to 85 percent against the common intestinal roundworm (Ascaris lumbricoides) and 74 percent against hookworm. It was likewise found effective against tapeworm (Taenia saginata). These results confirmed those of other investigators in other parts of the world. Hyxylresorcinol had, moreover, the advantage over similar other drugs known at the time, that of non-toxicity to man, a quality which allowed its safe use as a household remedy.

Dr. Tubangui aside from conducting these researches in helminthology devoted his time to another aspect of parasitology – protozoology. The Annual Report of the Bureau of Science for 1935 describes his work on the behavior of the protozoan haemoflagellate, Trypanosoma evans. This parasite was the causative agent of ebune surra. Together with Dr. F. del Rosario of the National Museum and Dr. M. Yutoc of the College of Veterinary Science of the Philippines he was intent on determining whether this protozoan parasite was capable of undergoing cyclic development in an intermediate host, was known to occur in related flagellates. The investigators confined their efforts at the time to the study of the kissing bug Triatoma rubrofasia since other insects related to it had been reported responsible for the transmission of South American trypanosomiasis or Chagas fever. Despite their extensive observations no positive results developed, an indication that most likely the insect in questions was not a biological carrier of the surra organism.
Tubangui’s interest in combating human parasites led him to study parasitic life found in other types of animals. His first published paper reflected this aspect of his scientific curiosity and was entitled “Parasitic of lower animals dangerous to man in the Philippine Islands. In the course of his years as parasitologist his publications were punctuated with studies of parasites in the palm civet, in chicken, fish, and cat to mention a few. Tapeworm parasites in Philippine birds became the object of an extensive research study which he undertook with the help of Dr. A.V. Masilungan. A total of nineteen species of tapeworms of our birds were identified by them of which fourteen species and one variety were described as new. Three were reported for the first time from the Philippines:

- Aporina delafondi (Raillet) 1982
- Fuhrmaniela cleric (Peeng 1933
- Gyrocoelia paradora (Linston 1906.

A comparison with tapeworm reported by other investigators as found in other places showed a close relationship between Philippine avian cestodes and those of India, Burma, Ceylon, Thailand and other countries in the southeastern portion of Asiatic mainland.

Tubangui’s continued concern with the conquest of parasitic infections led him to study the possibility of producing worm vaccines as a preventive against ascar’s hookworm, and other intestinal parasites. Other investigators had previously been able to induce in susceptible animals an acquired immunity against certain helminth infestations. This had been achieved by repeated infestations of susceptible host with a given parasite, or by the injection of worm vaccines. Up to the time that Tubangui took up this aspect of parasitological research, the dog as an experimental animal had been immunized only repeated infestations with a specific parasite. He then decided to look into the possibility of inducing immunity in the dog through the vaccine method.

Nine naturally infested dogs were divided into two groups. Five of them were vaccinated and the rest used as controls. Results obtained gave favorable indications of the efficacy of the vaccination against the hookworm Ancylostoma caninum. Some of the dogs showed a decrease in the parasite egg count following vaccination, while others revealed a gradual increase in the hemoglobin content of the blood in spite of the presence of large numbers of parasites. The lowered egg count was explained by one or both of two causes: 1) a reduction of the worm burden; and 2) a decreased fecundity of the parasites. The increased hemoglobin content pointed to the ability of the host to overcome the anemia usually associated with heavy worm burdens. It was also an argument to strengthen the valuable role of the toxin theory in hookworm pathogenicity.

Some two years earlier, with the help of Dr. Masilungan, Tubangui looked into the cercaricidal properties of the sera of various vertebrates. In experiments conducted on the cercaria of the human blood fluke, Schistosoma japonicum, Tubangui and Masilungan found that the sera of the parasite gave very low cercaricidal titers when compared with the cercarial-killing ability of the sera of the animals not attacked by the parasites. This finding showed that the cercaricidal test may be a useful instrument in the study of the life cycles of many cercariae whose adult stages are still unknown.
Tubangui's parasitological studies after the last Japanese-American War centered mostly on the problem of the round-worm known as filarial which live in the tissues of man. A series of three reports appear under his name in Philippine scientific literature, although that published in Acta Medica Philippina came out after his demise. Infection produced by the genus Wuchereria, responsible for what is commonly known as Bancrofts filarial and Malayan filarial, was studied by first conducting a survey of its infestation among the inmates of the New Bilibid Prison at Muntinglupa, Rizal and on two population groups in the province of Sorsogon, Luzon.

The examination of the prisoners, who came from forty-five different provinces, confirmed previous findings that filariasis was unevenly distributed in the archipelago. The Sorsogon statistic is revealed a high incidence of infection and a number of complications such as elephantiasis of the genital organs and lower extremities. Only the microfilaria of one of the various species of Wuchereria (i.e. the Wuchereria Bancroft, or Bancroft's filaria) was found in the blood of seventy-nine positive cases from different parts of the archipelago, exhibiting too, nocturnal periodically.

Tubangui and his coworkers then started looking into the efficacy of the drug Hetrazan in the treatment of Bancroft's filarial. Hetrazan by mount in two milligram doses per kilogram of body weight. These were taken three times daily after meals for ten to thirty days. At the end of the treatment almost all of the patients except for two showed no symptoms of filariasis. Instances of temporary toxicity were slight and did not prevent continuation of the treatment. At the end of the eleven months observation period for of the patients showed negative microfilarial count and five had very low counts. Hetrazan was judged by the investigator to have curative properties against the nematode and was recommended for use in the mass treatment of population in endemic areas.

Research was also conducted to determine the natural vectors of filariasis in known endemic foci. This was done through mosquito surveys. Sorsogon was selected due to the high incidence of filariasis in the region. An examination of sixty-eight individuals in that locally revealed an 18 percent filarial incidence. The study showed that the Aedes (Finnaya) porcilius mosquito was the natural vector of filariasis in the surveyed area. This mosquito is a night biting species abundant in abaca plantations. It was found responsible for the infection of 35 percent of the cases studied. More than half of the specimens examined likewise carried larvae in the infective or near-infective stage. The other mosquito species collected in the area were found negative for larvae of W. bancroft. Dr. Tubangui's work also disproved the common belief that the mosquito species C. Quinquefasciatus was an important vector in the preparation of filariasis.

Aside from engaging in distinctly parasitological studies Dr. Tubangui also turned to bacteriological problems. The greater part of the year 1937, for instance was spent by him and Dr. Masilungan trying to isolate the anaerobic bacteria that synthesized butyric acid. They were then looking for a process of producing acetone, butanol, and ethyl alcohol through bacterial fermentation. After a number of experiments they were able to isolate two organisms capable of transforming starch and other carbohydrates into acetone and ethyl alcohol. They then requested Dr. Basaca to study in detail the bacteriology of these organisms with a view to a more detailed description of their identity. Meanwhile they continued investigating the activity of these two organisms on various carbohydrate materials for the purpose of determining the most economical raw material to use, should this alcohol producing process become commercially feasible.
Tubangui decided to work with the cassava (Nanihot utilissima, Pohl) since this rich source of carbohydrates had not been tapped as a producer of acetone and normal butanol. The organism Clostridium acetobutylicum was employed to carry on the fermentation of the cassava carbohydrates. He envisioned that this bacteria produced alcohol and acetone would provide valuable assistance to the paint and varnish industry of the Philippines.

This activity of bacterial organisms on fermentable products led the scientific curiosity of Dr. Tubangui towards another related topic. He turned to the nipa palm tuba, which was a popular drink among barrio folk, but those clientele was circumcised to the area around the palm grove because of the perishable nature of the drink. He decided to experiment on means of controlling the fermentation period of the tuba so as to prolong its quality as a drink. He discovered that when the juice was subjected to a process of pasteurization it was possible to preserve the taste and flavor of the drink for a number of months.

With the outbreak of hostilities between the United States and Japan, Dr. Tubangui found his peace disrupted, first by the uncertainties of the war, and then by the occupation of the city of Manila by the invading troops. As the months and the years dragged on anxious but hopeful waiting, his laboratory work was forced into a period of partial unproductiveness, and this despite the efforts of the Japanese authorities to urge Filipino scientists into starting some form of research work. To set things in motion, a conference on medical sciences to commemorate the establishments of the puppet Republic of the Philippines was organized in 1943. Tubangui and his scientific colleagues were aware that this plan was but a veiled attempted to supply the Japanese armed forces with the needed material. Hence they refused to collaborate.

With the liberation of the Philippines a new spirit inbued the field of scientific research. Tubangui himself looked to the future with great optimism and the enthusiasm created by the new era in Philippine history gave him the needed energy to endure the hardship that accompanied those first years of reconstruction form the rubble and misery of war and deprivation. The very year of 1945 he reopened his office among the ruins of the Institute of Science. Three years later, he was appointed Head of the Department of Parasitology and Professor of Helminthology in the Institute of Hygiene. He was likewise appointed professorial lecturer in the post-graduate school of medicine of the University of the Philippines. Unfortunately this would mean less time to devote to study I the quiet of his much-cherished laboratory. Then on October 26, 1949 he succumbed, a victim of cancer. A little less than a month before his death, he had refused to be hospitalized. Those who appreciated his friendship and his worth as a Philippine man of science had offered to pay for his treatment and hospitalization abroad, but specialists had diagnosed that even if surgical treatment were successful he would have at most a year to live and that amid much pain and suffering. Despite the seriousness of this condition Dr. Tubangui never let even his own family in o n his sufferings. One of his daughters recalls that when they would find him with his head bent down over his desk he would reassure them that all he had was a mild stomach ache. This was an indication of one of his characteristic traits, his great concern not to have others worry about him. Neither did he discuss his work even to his own family. When his wife came across friends congratulating her for her husband’s work she would, of course, inquire from him a description of it. Almost invariably he would reassure her, I have not done any really important work. Don’t' take in all that they tell you about me. It was precisely this self-effacing spirit in a man who had proven his worth as a scientist that drew around his laboratory and even his home both students and foreign colleagues. American
scientists eager to discuss parasitological topics with him would offer to tend his lawn if only to have some precious moments of his time. On his part, he did relish talking shop with his colleagues as long as his personality was not put on a pedestal. His own students soon learned to appreciate these moments with their mentor and would at times stay up till midnight in lively conversation with Dr. Tubangui.

One of his research associates, as pointed earlier has one trait of his still very clear in her mind, his soft-spoken and mild disposition. It is part of the attractive charm of outstanding contributors to the treasury of human knowledge that they preserve a healthy perspective of the meaning of their achievements in the horizon of human achievements. Confucius indeed, once observed. So not think yourself so big that other people look small. Tubangui certainly saw the relevance of this statement in his life and lived up to it. He would not allow his personality to obscure that of his neighbors, nor his achievements to displace theirs. This respect of his for his fellowmen is a high tribute to his stature as a scientist. He sought the true and the good in the phenomena of nature, and respected them as these were revealed to him through the personality of other men.

Dr. Tubangui died at a relatively young age, but he had, during his thirty-two years of professional living, contributed significantly to the pages of Parasitology in the Philippines. Born in Porac, Pampanga, on April 25, 1893, Dr. Marcos Angeles Tubangui was a product of the public schools in both the elementary and secondary levels. Subsequently, he enrolled at the College of Veterinary Science of the University of the Philippines where in 1918 he graduated with the doctor's degree. After a year as a veterinarian of the Bureau of Agriculture he was awarded a U.P. fellowship to study in the United States. By 1921 he received his Master of Science degree from the New York State Veterinary College of Cornell University, in Itchaca, New York. Before his return to his native country he visited the Zoological Division of the Bureau of animal Industry in Washington, D.C. and was privileged to associate with a number of prominent parasitologists, among them R.T. Leiper, W.W. Cost, and J.E. Askest. It was while in Washington that he prepared his first paper on helminthology. He also took time out to become acquainted with the Marine biological Laboratories at wood Holes in Massachusetts and the scientific facilities of the University of Illinois.

His first position on his return to the Philippines in 1921 was that of Instructor of Veterinary Parasitology in his alma mater. During this first decade of his teaching stint at the University of the Philippines he rose to the rank of assistant professor, taught also physiology and assisted Dr. Benjamin Swartz, who was then Chairman of the Department of Veterinary Parasitology, On the latters' return to his native country, Dr. Tubangui assumed the chairmanship of the department.

The year 1931 saw him assume a new position after resigning his academic post at the University. Starting as parasitologist of the Bureau of Science he rose in a year's time to the position of Acting Chief of the division of Medical Biology of the Bureau when Dr. Schobl retired from the government service on June 30, 1932. It was not long before he was promoted to the rank of chief of the Bureau's Division of Biological Research. During these many years of service with the Bureau of Science, he carved out his name in the annals of Philippine Science. His foremost contributions as a scientist gained momentum during these years as parasitologist of the Government's Bureau of Science. He started to investigate the action of parasites of various hosts, including man, domestic animals, and other vertebrates. He also studied the relations of various animal parasites to those of man. His research on trematode parasites alone as found in Philippine
vertebrates took up a good part of his working hours in the course of thirteen years. The first scientific report on this appeared in 1928 and the ninth shortly before the outbreak of World War II.

The nation paid tribute to his scientific accomplishments in a posthumous Award of Distinction presented to his family on June 27, 1966 as part of the 65th Foundation Anniversary of the National Institute of Science and Technology. Marcos Angeles Tubangui was honored:

In grateful recognition an appreciation of this outstanding scientific contributions while in the service of the Bureau of Science, now the national Institute of Science and Technology, particularly his studies on human and animal parasites, especially the discovery of the vector in Schistosomiasis (Snail fever) and his taxonomic studies on Trematodes.

All this selfless dedication to the cause of scientific truth as discovered in the parasitic organisms of our country won for him honors and distinction both here and abroad. His name was enrolled in the roster of the honorary Sigma Xi Society; the American Society of Parasitologist; the Society for the Advancement of Research, Los Baños College; the Philippine Scientific Society; the Philippine Veterinary Medical Association; the Philippine Medical Association; and the Philippine Society of Parasitology. For many years he was president of this last organization.

Almost to his dying day Dr. Tubangui kept alive his interest and enthusiasm for parasitology. Several unfinished studies, particularly on paragonimiasis and filariasis, lay on his office desk when he passed away, yet a few days before that fateful October 25 he repeatedly let his wife know of his concern and hope that he would recover enough strength to finish them. As events turned out, two of his colleagues at the Institute of Hygiene of the University of the Philippines, Dr. Benjamin Cabrera and Dr. Mariano Yogore, Jr. saw to it that Dr. Tubangui’s investigations on the Paragonimus and Filariasis parasites were completed and produced.

Dr. Tubangui was survived by his wife, Mrs. Paz del Rosario-Tubangui and five children, two boys and three girls. Since none of them chose a scientific career, the specialized library of Dr. Tubangui was eventually donated, together with his notes, to various colleagues, specially Dr. Lope Yutuc, and to the University of the Philippines.

NOTES

1. This surname is sometimes spelled with the variant Tubangui,
2. Dr. Victoria Masilungan recalls that during the fourteen years (1934-1948) she worked under him she never even once saw him lose his temper. His equanimity of disposition was indeed, to his subordinates, a reassuring asset.
3. Parasitology, as a branch of biology is concerned with organisms living in or on other living forms and which obtain from these all or part of their organic nutrients. Parasites show likewise some degree of adaptive structural modifications. Parasites belong either to the plant kingdom or to the animal kingdom. The former are studied in bacteriology, virology, and mycology. Those of the animal kingdom are studied in parasitology.
4. Parasitic worms of interest in medical parasitology belong to two phyla, the roundworms (nematelminthis) and the flatworms (Platyhelminthes). Important
species in the first phylum is the class of roundworms (Nematoda) cylindrical in shape and without suckers. In the phylum Platyhelminthes two classes are important, the tapeworm (cestoda) and the flukes (trematoda). Tapeworms show a number of similar units or segments, while flukes have a leaf shape and possess two muscular suckers.


6. The miracidium is the ciliated larva which hatches from the egg. It develops into the nonciliated, sac-like larva (sporocyst) which is found in the organism harboring the parasite (host). This host is termed intermediate if it nestles the larval or a sexual stage of the parasite.

7. The cercaria is the larval form of the fluke. It has a tail which is forked in the schistosomes and straight in the hermaphroditic flukes. The cercaria emerges from the snail. Encystation protects the animal by a cyst wall.


9. Binomics or bionomics is the branch of biological sciences dealing with the interrelationships of organisms and their environment, particularly as manifested by natural cycles and rhythms, community development and structures, interactions between various kinds of organisms, geographic distributions and population change. It is also called ecology.

10. Metacercaria represents the larval stage of flukes following the cercarial stage. The metacercaria is a cercaria which has lost its tail upon entrance into a second host.


Scientific Contributions

1. 1922 Parasites of lower animals dangerous to man in the Philippine Islands. The Philippine Agriculturists. 11: 243-250.


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<th>Year</th>
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<td>1932</td>
<td>Molluscan intermediate host in the Philippine of the Oriental blood</td>
<td>fluke, Schistosoma japonicum.</td>
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<td>1933</td>
<td>Life history of the human intestinal fluke, Euparyphium ilocanum</td>
<td>(Garrison: 1908), by M. A. Tubangui and A.M. Pasco. Philippine Journal of Science 51: 581-606</td>
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26. 1947 Notes on the anthelmintic properties of the latex papaya (Cerica papaya Linn.) and “Isis” (Ficus ulmifola Lam.)


Volume 2
H. OTLEY BEYER  
1883-1966  
Anthropologist

H. OTLEY BEYER, the Henry he never spelled out in his signatures, was born in Edgewood, Iowa, on July 13, 1883. It appears that he had an uncle with exactly the same name who managed a store and operated a creamery and as the younger Henry was collecting stamps he found his mail was going to his uncle’s box so he started to abbreviate his name. His father, J. David Beyer, was a soldier in the U.S. military service for 21 years; during the Civil War he joined the 27th Iowa Volunteers (Infantry) and was wounded twice in action. J. David Beyer’s paternal ancestor came from Denmark as an immigrant from Bavaria, East Germany, and he carried the Gemanic family name Beyer; this ancestor later crossed the Atlantic arriving in Philadelphia in 1784, one of his descendants becoming one of the three pioneers of northeastern Iowa sometime in 1829.

H. Otley Beyer was the first of three children of J. David Beyer, a former soldier of the U.S. army, with his second wife, Katherine Fleck, who as a simple housewife and native of Sinking Valley, Pennsylvania. Returning home from the Civil War his father devoted himself to his homestead when he raised an orchard of 30 acres. Most of his boyhood years were spent pleasantly on the farm while getting his elementary schooling locally. This farm was not far away from two American Indian groups, one of which was the fox, and the young Henry was introduced quite early to American Indian life.

After finishing at the Edgewood High School in 1900, he went with a friend to the south in Alabama and Mississippi, where he worked in a small town newspaper writing features sometimes. The following year he was enrolled at Comeal College in Mount Vernon, Iowa. He then moved to Iowa State College and later to the University of Denver where he obtained his A.B. in 1904 and his 1905, writing a thesis on the chemistry of rare metals. During two summers before graduation he worked for the U.S. Geological Survey, part of which training carried him to Colorado bordering other states and getting introduced to archaeology by stumbling into dwelling cliff sites.

Sometime in June-July 1904 he spent a couple of weeks at St. Louis, Missouri, viewing the big exposition going on there. This was in fact the Louisiana Purchase Exposition celebrating the 100th anniversary of the purchase of Louisiana territory. The planners wanted to make it a real big event, a world exposition that would surpass anything of its kind held previously. H. Otley Beyer visited the exposition grounds and what attracted his attention most were the Philippine exhibits which featured a live show of human beings. He saw a number of the so-called wild peoples of the Philippines in their transplanted habitats, for aside from native peoples from several parts of the country - Negritos, Igorots, Visayans, Moros - native houses were constructed on a 50-acre land simulating specific local communities and environments. Bamboo, nipa, thatch and rattan were shipped to St. Louis to make the villages look realistic, a lake was dug to capture the Lake Lanao life complete with houses on stilts over the water and vinta to spare. There was a Maranao orchestra playing on native musical instruments that attracted thousands of Americans, among them Frances Densmore, later to become the outstanding ethnomusicologist of her age. Although this lady did not come to the Philippines as H. Otley Beyer did, she was the first American to write on Filipino music and scale. His interest aroused, H. Otley Beyer talked to Dr. Albert Ernest Jenks, official in-charge of the exhibits and the chief of the Philippine Ethnological Survey. He received
some encouragement, and by the Fall of 1904 he had decided to join Philippine colonial service.

It was probably the same pioneering spirit that ran in his ancestors’s veins that prompted the young H. Otley Beyer to cross another ocean and join the American administration in the Philippines. On August 16, 1905, he landed in Manila only to find that his position had been abolished by the Reorganization Act of 1905, the Ethnological which was under the Department of Public Instruction. As this department was under the administration of Dr. David P. Barrows, a Ph. D. graduate in anthropology, H. Otley Beyer accepted the alternative of an assignment in Mountain Province. After making his purchases and preparations in four days, he took the train to Pangasinan, which at this time was being ravaged by the dreadful cholera. He did not cower from the ghastly scenes he saw along the way for he had started on a medical career and had taken enough precautions. It was also in Pangasinan where a tropical storm overtook him, his first experience in the Islands.

With the help of cargadores, he reached his destination, Banawe. After looking around for a few days, he decided than and three to make the Philippines his home, for what he saw in the Louisiana Purchase Exposition was now more than a reality. He had started to love the mountain landscape and rice terraces, the villages and the people in them about whom he had seen displaced in St. Louis.

Beyer served as a supervising teacher with headquarters at Banawe, advantage point from while he sallied forth into the various villages and regions. But as he was not trained for anthological work, sometime in April 1908, he decided to leave for the U.S.A. to obtain formal training and education in the study of man and his culture. He sailed in May via the Asian ports to the Middle East, made trips to the pyramids of Egypt and visited museums in Europe along the way. He had saved enough and tugged along a native Ifugao to take along to Harvard where he took courses in anthropology, among them being those under Dr. Roland Dixon and Frederick Ward Putnam, the builder of American museums, under whom he wrote a number of papers on Ifugao culture and ecology.

By January 1910 Beyer was back in Banawe and although he did not get any advanced degree from Harvard, he was now a much more enlightened person, having now the training to do anthropological work in Mountain Province. Something else happened in this year. He noticed that one of the village girls had grown up since he left not more than a couple of years ago; she was in fact the daughter of the college chief of Amganad. Her name was Lingnayu. Beyer’s earlier picture of her was with bare bosoms, the breasts hardly showing as yet, now she was fully a maiden. Beyer must have contracted marriage following Ifugao customs sometime in the latter part of 1910. He spent two bagful of silver coins to distribute to all the relatives of his wife. They had a couple of children, but the first one died in infancy.

It is not known how much of Ifugao culture Beyer learned by getting married to a native woman. H. Otley Beyer during his lifetime was very reticent about his married life. This was a period in the history of anthropology when anthropologists were still shy about arising on the sex life of native peoples and Beyer belonged to that age. There is nothing either from his notes that showed his interest along this line. His collecting work and notes were still largely in manuscript form yellowed by age.
Aside from these papers, from 1910 to 1914 he was engaged in collecting the literature on the Ifugao people; he expanded his field work among the other mountain peoples such as the Bontok, Kalinga, and others. He also started copying and translating a few and annotating them, or asked others to make the translation. For instance, he translated one of Fr. Juan Villaverde’s works and entitled it The Religious Beliefs of the Kiangan Ifugaos, doing it together with John M. Garvan and Emerson B. Christie. As his collecting work and field notes on the peoples of Mountain Province were expanding, it dawned upon him to broaden this into something monumental - the collecting of everything written, published or unpublished, of the history and culture of the Filipino people. This idea dawned upon him in fact in 1917 when the Philippine Ethnographic Series was born.

But something else happened in 1914. The ethnological work of the Bureau of Science to which the early survey was relegated finally was suspended in that year, thus throwing Beyer out of work. The young ethnologist was ready to pack his things and artifacts for home when a number of educators thought that the situation could be saved by opening up anthropology courses in the State University. But there was some opposition from among the members of the Board of Regents, especially in the person of the Archbishop of Manila who sat as one of the members. The young Beyer was eyed by Rafael Plama as the prospective candidate to handle the courses, but some regents were not sure of the kind of anthropology that was going to be taught. He was called to a meeting, and the Archbishop was able to extract a promise from Mr. Beyer that he was not going to teach evolution in any of the courses. In later years, H. Otley Beyer told me he just promised, but true to the profession he always discussed evolution in his introductory courses and whenever there was an occasion. It was diplomatic move, but it must be remembered that evolution was banned in many schools in the United States up and until the twenties.

In the second semester of the school year 1914-15, the introductory courses in anthropology were offered with 17 students to start with. This course and other anthropology courses that were instituted later were given under the Department of History, then under the headship of Austin Craig. Sometimes he was asked to teach a course in sociology or Oriental history during the absence of Craig. From 1924 to 1917 when the Department of Anthropology was created as an independent unit, Professor Beyer single-handedly conducted the anthropology courses.

However, in 1917, during the first semester, Encamacion Gonzaga, who had just finished her M.A. in March of the same year, was taken in as assistant, and together with Cecilio Lim as instructor, formed the faculty. By this time the number of courses had expanded from one in 1914 to eight courses in 1916. As Miss Gonzaga resigned after one year, Mr. Marcelo Tangco was taken in to replace her sometime in November 1918. In 1916 new courses, the following were created in the undergraduate level; Philippine archaeology, Philippine folklore, Folklore of Eastern Asia and Oceania, and Physical anthropology. At one time Mrs. Hazel Clark Taylor, who was very assiduous in assisting Prof. Beyer in collecting material from students, taught folklore; and John M. Garvan, the anthropologist who went native, taught anthropology as lecturer in 1920-1921. In 1921, the Sociology was removed from that department and together with that of Anthropology the Department of Anthropology and Sociology was created, a joint arrangement which lasted until after World War II in 1951.

Aside from teaching, Prof. Beyer’s services were engaged by the Museum branch of the Philippine Library and Museum as curator from January 1, 1918 to December 31, 1922. In
1918 his services were further sought by Deputy Governor Frank C. Carpenter who sponsored a series of researches in Mindanao and Sulu to be carried out by Prof. Beyer and Dean Charles W. Baker of the College of Agriculture, University of the Philippines, because up to that time the American administrators were making little headway in controlling the Muslim groups. This gave Beyer a chance to make several trips to the south and to gather material from a rather neglected area, thus expanding his Philippine Ethnographic Series which by this time was reaching a hundred volumes. Much of the data gathered up to that period he condensed and used in writing “Non-Chrismatan Peoples of the Philippine Islands,” a monographic work which got published in the Census of the Philippine Islands, 1918.

SOMETIMES IN 1919 Prof. Beyer accompanied the recently named Secretary of the Interior Teodoro M. Kalaw and Insular Auditor dexter on a fact-finding mission to the Dutch East Indies, a trip that took them almost three months visiting Java, Celebes and Borneo. Something meaningful resulted from this trip because Prof. Beyer and Architect Juan Arellano had the opportunity of viewing the monumental remains and archaeological collections in and around Djogjakarta and Surakarta. This trip in particular aroused Beyer’s curiosity about the prehistory of the Philippines and its possible relationship with the south.

Upon the return of the mission to Manila, Prof. Beyer busied himself with gathering the printed literature on Southeast Asia. This resulted in the following year of the termination of a two-volume work on The Philippines Before Magellan. Two chapters of this voluminous opus were published with the same title in Asia magazine in 1921.

In the same year, 1921, a great part of his time was spent with the wood-Forbes Mission which carried him to many parts of the country, thus enabling him to make observations of the different ethno linguistic groups at close range. Appendix 9 of the Mission’s report was written by him.

The period 1922-1924 found Beyer once more in the classroom, though he was acting in an official capacity as adviser to the governor-general on minority-group problems. In the later part of 1924 he was once more attached to another mission, the Munroe Educational Survey, which enabled him to make several long trips to the Visayan Islands and southern Luzon.

During the administration of Gov.Gen. Leonard wood, he was named a member of the Industrial Relations Survey which was created purposely to study labor and industrial relations of Filipino workers in Hawaii. He served for nine months, giving him at the same time the opportunity to examine the studies and collections being made in the Bishop Museum in Honolulu, data and material which were useful in rounding up his theory of the peopling of the Pacific basin.

His work in Hawaii having been terminated, he thought of visiting U.S.A. By this time he had already made a name. Aside from seeing his parents and relatives in Iowa, he paid a visit to the University of Michigan, Princeton, Chicago, New York, and Harvard. He was offered a chair in anthropology in Michigan and Princeton and a research professorial at Harvard. The Harvard offer was a tempting one and he was considering it even after he had returned to Manila. In fact, he had started to send materials to Harvard in anticipation of occupying the research professorship, but something else detained him. Sometime in February 1926 Prof. Beyer received reports of an archaeological site in Novaliches, a little over 20 kilometers from the U.P. Campus in Manila. The government
engineers or private contractors while excavating the foundation for the dam accidentally came across a rich deposit or prehistoric data. He visited the site immediately and he was convinced that here was an opportunity to decipher the prehistory of the Philippines.

As he was occupying a house on Santol Street, Santa Mesa, the time came when this was not enough to contain the material that was being unearthed in Novaliches. He rented a couple of apartments on Nebraska Street, close to the University campus and made these his storehouses and rooms. Later when specimens could not be accommodated in these apartments, he used the basement of the Bureau of Mines building on Herran Street; and as more material came from other sites, he rented two more apartments, one on Nebraska and the other on Florida Street. By this time he had a choice collection of Filipiniana which was housed in three of the apartments besides those that were shelved in the Rizal Hall Annex, the second floor of which being assigned to the Department of Anthropology.

It was Beyer's habit to acquire at least two copies of any Filipiniana item that became available in print. He put in one volume three or four titles of the same author, such as the Tagalog novels that flooded the market and had these bound. With the metrical romances (the awits and corridos), he would put together some six or eight titles depending upon the thickness of the material. He bought bookcases made of narra and these lines up the walls of the departments, up and down. The periodicals he put them in boxes properly numbered and indexed.

Probably aside from the Novaliches site which kept him busy for the next few years, the discovery of many other sites in the vicinity, there were other things that he wanted to do. One of these was the building of a Filipiniana collection that could not be rivaled by anything of its kind in the world. He picked up anything in print up to movie programs, invitations, and posters. Whenever he went to the downtown area and he happened to be on the Escolta, Rosario or Carriedo Street, he could be seen dropping in any of the bookstores, buying anything to him of value, collectanea, or ephemeral print. He was an indefatigable and tireless collector. He made lists or catalogues of the items, but his collecting activity was faster than he could list them. His listing was a far cry from the real collection, for heaps, piles up in many places in the apartments on chairs, tables, and corners.

Beyer continued with his archaeological investigation which expanded to the Laguna de Bay district. This he called the Rizal-Bulakan Survey which lasted for five years, 1926-1930 and netted nearly a quarter of a million specimens: stone implements, pottery, iron tools, bronze artifacts, procelain, and all sorts of materials.

Beyer became a collector of artifacts, pottery and porcelain from other places. He had been receiving all sorts of news about accidental finds in provincial areas; sometimes he found time to visit these sites, especially those close to Manila; or he would establish collecting stations with native residents who did the gathering of specimens. Most of the time, however, he has to depend upon provincial collectors who brought the stone implements or porcelain to his quarters. He had collectors from many places in the country, Americans and Filipinos alike. He paid for all those brought to him. Thus, he made one of the most enviable collections of oriental ceramics ever assembled in Manila before World War II. He was very assiduous in having the specimens washed or cleaned, labeled or numbered and catalogued.
In the Manila area alone he collected from every excavation made for the foundations of buildings like those of the Ideal Theatre, The Philippine National Bank, the Cu Unjieng Building, the Post Office, and many other places. He discovers the Santa Ana site. While crossing the Pasig River in a banca during low tide, he saw specimens of porcelain sticking out of the river bank. This evidence became the clue to his discovery there. It was a significant site which gave Beyer basis for establishing chronology, typology based on diagnostic features. In and around the Laguna de Bay area he had many sites; those in Taguig, Pasig, Tanay, Morong among others. He had almost a hundred sites in Rizal province alone which radiated from the Novaliches discovery and the survey he made of this area was a testimony on his deep interest. He extended field work to Batangas province where he collected thousands of artifacts.

Although he never had time to cover the entire Visayan Islands, he had collectors from Leyte, Samar, Cebu, Bohol, Negros, Panay and smaller islands who made deliveries to him in his office or apartments. He sent his own money almost in every instance, for he did not like making vouchers or requisitions for supplies which the government required. He did not have time to do these details nor reporting expenses incurred. He would rather pay any expenses from his own pocket upon delivery of the goods.

Beyer's Philippine Ethnographic Series was getting some publicity. A number of volumes had already reached Harvard and visiting social scientists were being shown the collection every time they came to visit Manila. The American governors-general came to know about its existence and so also a few Filipino leaders and U.P. President, but its contents have not been tapped by another pair of hands except its collector until Dr. F. D. Holleman, the Dutch specialist on custom law came in 1930 to select the material which became the Philippine Customary Law in 11 volumes. As President Rafael Palma was the chairman of the Philippine Customary Law Committee which made arrangements with the Adat Law Foundation of Indonesia, the work was facilitated as Beyer himself was a member of that Philippine committee.

It is not to be supposed that there were no other scholars interested in the prehistory of the Philippines and Southeast Asia. In fact Professor Beyer was in communication with them, so that when the First Far Eastern Prehistoric Congress was held in Hanoi in January-February, 1932, he became the official delegate from the Philippines. He spent some five weeks in northern Indo-China and South China and learned about the existence of rice terraces in certain areas there. This influenced his thinking later about the origin of Northern Luzon rice terraces. He presented three papers before the Congress.

During his absence Captain F.G. Roth found sometime in February 1932 a number of Neolithic stone tools and other artifacts at Cuenca, Batangas. Soon after his arrival, Prof. Beyer visited the Cuenca site and found it quite revealing because it was very extensive and warranted all the attention that it needed. So from 1932 to 1937 work was focused on this area. Beyer himself wrote:

More than 120 square miles altogether were explored during this Survey, and the total collections obtained number several hundred thousands of specimens. They were chiefly from the Stone and Bronze Ages – and it was proven than Batangas had a barrio population 3,000 years ago eristic of the people were worked on during the course of the Survey.
With the succession of archaeological turn-over from Philippine sites since the discovery of Novaliches in 1926, distinguished pre-historians came to Manila to visit Professor Beyer. In 1929 his own professor from Harvard, Dr. Roland B. Dixon, spent a month in Manila with him to study and familiarize himself with the funds so far known. Dr. P. V. van Steinh-Callenfels, of Batavia also paid H. Otley Beyer a visit; and so also Fr. D. J. Finn of Hongkong.

As a result of Prof. Beyer’s archaeological work, the Second Far Eastern Prehistoric Congress was held in Manila in February 1935. Nearly 20 scientists and pre-historians from some seven different oriental countries participated. Dr. G. H. R. von Koenigswald, of prehistoric Java man fame, being among those who read a paper. Beyer himself presented two important papers: “A Report on Prehistoric Beads and Other Ancient Jewelry in the Far East” and “The New Stone Age in Batangas Province, ca. 1000 B.C.”

From 1935 up to the outbreak of the Pacific War in December 1941, Prof. Beyer was busy concentrating on Philippine archaeology and prehistory. He had minor explorations in the Visayan Islands and Northern Luzon. In 1935 his first article on tektites appeared, he contributed a long study on the prehistory of the Philippines; and started catalogues of two archaeological sites. Then in 1938 Prof. Beyer and Dr. Eduardo Quisumbing represented the Philippines at the Third Far Eastern Prehistoric Congress at Singapore and Malacca. During the congress the French government presented him to order of “Officer d’Academie” in recognition of his contributions to the prehistory of Southeast Asia. To the Sixth Pacific Science Congress he sent two papers “The Stone Age in the History of Luzon” and “Philippine Archaeology and Its Relation to the Origin of the Pacific Islands Population.”

When the Pacific War broke out in December 1941, Prof. Beyer was caught unaware with four apartments on Nebraska and Florida Streets filled to the brim with archaeological stuff, Filipiniana, periodicals, and ethnological specimens of inestimable value; the basement of the Bureau of Mines building was also overflowing with cans and boxes of archaeological specimens; and the second floor of the Rizal Hall Annex was full of Filipiniana, manuscripts, articles, tektites, archaeological and ethnological materials. Immediately upon the occupation of Manila by the Japanese military the U.P. buildings were occupied almost at the same time. His collection in the Rizal hall Annex was therefore the first one to suffer; this was robbed of its precious contents, mostly of the gold jewelry, prehistoric ornaments and jade, while he stayed close by at the Ateneo de Manila premises.

Later Dr. Tadao Kano came to see him, a very fortunate event indeed; for it appeared that Beyer used to know him in Harvard. His presence in Manila as liaison officer was an auspicious one and paved the way for a better treatment and consideration of his collection. Sometime in May 1943 the collection in the second floor of the Rizal Hall annex was transferred to the Watson building on Aviles Street (now renamed Laurel Street), close to Malacañang Palace. From time to time Prof. Beyer was allowed to transfer other material from his Nebraska apartments, too. This is how he saved about one half of his valuable collection of Filipiniana and anthropological material.

As Japan was losing its grip in the Pacific, sometime in September 1944 Prof. Beyer was taken into the Santo Tomas Interment Camp where he stayed until the liberation of the big city in February 1945. He busied himself right away, though in a different kind of activity. In khaki pants and shirt with long sleeves he made the daily rounds with the American military engaged in salvage work. He was thus enabled, with the assistance of
the U.S. Army and Filipino assistants to save Filipiniana belong to the National Library and the Bureau of Science including valuable Rizaliana. But nothing more was saved of his collections housed in the apartments on Nebraska Street; everything, even stone implements, got pulverized by the shelling and fire.

With about one-half of his archaeological and book collections in the Watson Building intact and the Philippine Ethnographic Series saved, he started to finish one or two manuscripts left behind in pre-war years, or to write or dictate off and on to his secretary, Miss Natividad Noriega, two important works which remain to this day his main contributions in the field of Philippine archaeology and prehistory. These are the Outline Review of Philippine Archaeology by Islands and Provinces and Philippine and East Asian Archaeology and Its Relation to the Origin of the Pacific Islands Population. The first is a handy summary of archaeological work some kind of work had been carried in the past presented in a thumb-nail style. The second work is an interpretative and reconstructive study based on thousands of specimens and printed material in which a theoretical framework of Philippine prehistory is laid out in general terms. Both works had their beginnings, of course, from pre-World War II years.

These two works were the culmination of his career as an archaeologist and prehistorian. Although he never showed any sign of relaxation in his anthropological activities, nothing more significant came out of his pen. He, however, supported with vigor the plans of the National Congress in Quezon City in 1953 to which the 4th Pre-history Congress became a part. In the field of anthropology and prehistory he worked hand in hand with Dr. Patrocinio Valenzuela in carrying on a successful congress which was held in Quezon City on November 16-28, 1953. It can be said that the success of the anthropology division of the 8th Pacific Science congress and the Prehistory Congress was in a large measure due to his untiring efforts. Then he edited parts of the Proceedings.

The close of the Congress also marked his retirement from the University of the Philippines. He was retired as Professor Emeritus of Anthropology with Prof. Marcelo Tangco taking over the chairmanship of the Department of Anthropology. But he continued to work by putting in shape such papers as New finds of fossil Mammals from the Pleistocene Strata of the Philippines (1957) and just as product of his pre-World War II listings.

He continued to receive students, scholars, visitors and experts in the Museum housed in the Watson building on Aviles Street as he used to after the liberation of the country from the Japanese occupation. Now he did have enough time to talk about his collections whether the visitor was an anthropologist, archaeologist, collector, or just a curious outsider. He loved to reminisce about the past and the personalities he knew best including governors-general and Filipino leaders who at one time or another sat in his classes.

He was an inveterate smoker and could consume half a dozen cigars a day. He would invite friends and visitors to Jai Alai, his favorite sport, after the day’s work or interview, entertaining them in this hectic game of calculation, chance, give and take.

One late evening as he came home from Jai Alai he rolled down the stairway and sustained some bruises. He appeared not show any concern the following day; he explained that he used his elbows rolling down as he used to in his youth when he played football and this trick saved him from being hurt. But he fell again downstairs afterwards.
and he lost some blood, but he never consulted any doctor. He must have been missing the steps.

In spite of having started for a medical career, he feared the mention of hospital and doctor. When a friend died, he did not like the idea of seeing him for the last time in the funeral parlor. He said he wanted to have a picture of him in his memory as when he was alive, never of a years, even before the war. His friends said it was not going to be any major operation and he understood it. But he never submitted to surgery until he was almost dying of it when the doctor said it was just a matter of hours if he did not submit. He yet lived for some ten years after that operation.

He suffered one more from loss of blood when he bumped his head against one of the showcases one night as he came home from Jai Alai. Professor Beyer got hospitalized in 1966. At the end of that year he died.

After the necrological rites on the U.P. Campus, his body was brought up to Banawe where he wished to rest. All sorts of honors and last rites were performed over him - Catholic, Pagan and official honors (and previous Protestant ceremony on the U.P. Campus). His body was also brought to Amganad village where the old house stood since his early married years. Another modern house was constructed after the war to attract Professor Beyer back, but work prevented him from ever going back to his first love after the war years. The traditional rituals were performed; there was singing of the two Ifugao epics, the Hudhud and Alim, for that would please the dead according to his kinsmen. His body was finally laid on an open platform with galvanized iron for a roof on a mountain shoulder below his son’s cottage.

The contributions of Professor Beyer to Philippine culture studies are both wide and deep. They have attracted attention here and abroad. They have not only illuminated Philippinesian backgrounds, but that of Eastern Asia and Oceania as well. Before Beyer came there was no Philippine prehistory to speak of. When he started his career in research he practically did so from scratch. After a generation of dedicated labor he gave us a chronology and a prehistory. In the absence of ancient writings, the historian folds his arms. Professor Beyer does not claim that his works are free from imperfections and gaps. His contemporaries and successors are eager to puncture his theories the best way they can, with new methods and other findings. Others are glad to add new knowledge. Prospects are bright that with many more workers in the field, with the groundwork laid for them and awareness of the problems, anthropologists now and in the future will be in a better position to contribute their share to a review and refinement of Professor Beyer’s conclusions and each other’s findings.

- E. Arsenio Manuel

NOTES

1. Albert Ravenholt, “Dr. H. Otley Beyer,” American Universities Field Staff Reports Service, v. 12, no. 4 (1964), p. 4

2. From my Notes in an interview with H. Otley Beyer, October 29, 1960

3. To gain a better picture of this grandiose exposition, at least during the first decade of the 20th century, see Report of the Philippine Exposition Board in the
United States for the Louisiana Purchase Exposition (Bureau of Insular Affairs, War Department, 1905).


5. One of these early papers was retrieved from oblivion by Harold C. Conklin, and has been published with Elmer D. Merrill as junior author in “Ilfugao Ethnobotany 1905-1965; the 1911 Beyer-Merrill Report in Perspective”, in M.D. Zamora (ed.); *Studies in Philippine Anthropology* (in Honor of H. Otley Beyer), 1967, 204-264; a work that was reprinted in *Economic Botany*, v. 21, no. 3 (Jan-Sep. 1967) 243-272.

6. This *Mona Lisa* of a picture used to be in the H. Otley Beyer Picture Collection.

7. Ravenholt put it in 1912; *op. cit.*, p. 7.


9. A number of these were listed by Harold C. Conklin in his *Ifugao Bibliography* (A Southeast Asia Studies, Yale University, Bibliography Series No. 11, 1968).


12. I did not come to know him, but Prof. Beyer told me he was the anthropologist who filed his teeth and lived with the Manobo of Agusan. He is a major contributor to Philippine studies and should merit attention some day. Among his significant writings are *The Manobos of Mindanao* (1931) and *The Negritos of the Philippines* (Wien, F. Berger, 1964).


19. Among those who bound his Filipiniana I remember Lorenzo Cribe, who learned the trade during the Spanish regime, and Sofronio G. Calderon, Tagalog writer and Filipinist.


21. Four typewritten copies were made of this compilation and bound; one set went to the Library of Congress, Washington, D.C.; another to the *Adat Law Foundation at Leyden*; another to the U.P. Library, Manila; and lastly to the Beyer collection.

22. The first Research Committee on Philippine Customary Law was organized sometime on September 8, 1919, under the chairmanship of Hon. Norberto Romualdez, and in which Prof. Beyer was one of the members; this was reorganized by Vice-Governor Gilmore in 1923.


24. From his “Notes”, already cited. Pp. 6-7


26. “Notes on Fossil Man in Java” was read during the first session on February 8, 1935.

27. These contributions, however, are not to be found in the *Proceedings* which up to the present time has not been published.


30. Catalogue of the Hacienda Ramona Archaeological Collection, from Porac, Pampanga Province (Manila: 1936-39); TS, 30 leaves (not completed); and Catalogue of the Special Kubao Site (Rizal Province); Tektites, Microliths, Palaeoliths, etc.), vols. I-III (Manila: 1936-39).

31. These are found in *Proceedings of the Sixth Pacific Science Congress*, v. 4 (Berkeley, Univ. of California Press, 1940), 153-156; and 157-164.

33. Published as Bulletin No. 29 by the National Research Council of the Philippines in December 1948 (130 pp. + 32 figs.).

34. Especially the Proceedings of the forth Far-Eastern Prehistory and the Anthropology Division of the Eight Pacific Science Congresses Combined (1956) though less than two fascicles of Part I were finally published.

35. Published as Bulletin No. 41 (February 1957) by the National Research Council of the Philippines, and issued in separate form.

36. Published by the Office of Research Coordinator, Univ. of the Philippines, 1962 (vol. I, 290 pp.)


SCIENTIFIC CONTRIBUTIONS


Published in M.D. Zamora (ed.) Studies in Philippine Anthropology (1967) 204-262, with introduction by H. C. Conklin.


   


13. 1910 “Arrangement of data in the history and ethnography of the Ifugao people,” being a collection of all the proposed tables of contents and schemes for arranging the data in various sections of the work. In *Ifugao People*, v. 1 paper


17. Notes on a collecting trip in the Province of Pangasinan, during August-September 1913, with a list of the Museum specimens collected” in *Philippine Ethnographic Series*, Pangasinan Set, v. 2, paper 41.

18. 1915 Chronological catalog of works in (or relating to ) Philippine Languages” in the Beyer Collection of Filipiniana on Feb. 15th, 1915. MS, 4 vols.

   v. 1 (1801-1900) registers the oldest item in the collection which is Melchor Fernandez: *Manga Pagninilaynilay* (Sampaloc, 1825); this volume contains 379 entries plus 29 others.

   v. 2 (1901-1905) registers 317 entries.

   v. 3 (1906-1915) registers (633 entries.

19. 1912-15 The religious beliefs of the Kiangan Ifugao’s,” by Juan Fernandez Malumbres, with an introduction and notes by Julian Malumbres, translated into English from the original Spanish text by H. Otley Beyer, with the assistance of John M. Garvan and Emerson B. Christie, In *Ifugao Peoples*, v. 3, paper 3, TS, xii, 167 leaves.


25. 1915 “Correspondence and records concerning the Igorot mummy (ano),” in Philippine Ethnographic Series, Igorot Set, papers 47 and 48.


29. 1923 General Index to the Philippine Ethnographic Series. 2 vols. Various paged.

   Vol. 1 (1912-1922) “contains a list of the contents of the entire 123 volumes prepared up to the end of 1922.” Vol. II (1923): a general tables of contents to all volumes completed during the year 1923.

30. Philippine Ethnographic Series

   Set  
   1. Bisaya (12 volumes)  
   2. Bikol (2 volumes)  
   3. Tagalog (20 volumes)  
   4. Sambali (2 volumes)  
   5. Pampangan (3 volumes)  
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13. the Igorot (6 volumes)
14. Ifugao People (20 volumes)
15. Bontok (5 volumes)
16. Itneg-Kalinga (7 volumes)
17. Negrito-Aeta (5 volumes)
18. General Philippine Ethnography (6 volumes)
19. Philippine Folklore, Customs and Beliefs (20 volumes)

31. 1924 "The Ifugaos using world’s most perfect calendar. Each month has same number of days – have new year’s day and also include leap year. The Tumunuh, or clan astronomer, keeps string calendar and tells tribesman When to plant and harvest;" Philippine Free Press, v. 18, no. 30 (July 26, 1924) 2.7.


33. 1926 Steigner, g. Nye, H. Otley Beyer and Conrado Benitez: A History of the Orient (Ginn & Co., 1926), ix, 469 pp). Chapters IV, IX, XIV, and XVI; Together with the latter half of Chapter V, are the work of Professor Beyer.

34. 1926- Catalogue of the special San Juan District collection Central Distict, Rizal Province. Vo. 1, Manila: 1926-27. In the Beyer Philippine Archaeological Series vo. IV.


38. 1929 Memorandum on Philippine customary law,” prepared for use of Vice- Governor E. A Gilmore, Manila, Sept. 30, 1929. TS 24 leaves In General Philippine Ethnography, v. 5, paper 138; also in Philippine Customary Law, v. 1, paper 2


42. A brief history of the study of Philippine customary law and the various committees constituted for the purpose.” Manila: 1931. TS 26 leaves. In General Philippine Ethnography, v. 5. paper 137. also in Philippine Customary Law, v. 1, paper 1.


49. 1933-34 Philippine Tektites. Together with a full bibliography of tektite literature and a series of papers dealing with the general character and probable origin of the material. V.1, papers 1-10 (Manila: 1933-34). Preface dated Nov. 15, 1933. 415 pp.

50. 1933 Pugad-babuy Catalogue. A general accession-list and catalogue of the combined tektite and archaeological collection for the Pugad-babuy site of Bulacan Province. Luzon. V.1 (Manila: 1933); v. 2 (Manila: Jan-June 1934), TS, 174 leaves; v. 3 (Manila: 1934), 179 leaves.


52. The New Stone Age in Batangas Province, c. 1,000 B.C. Proceedings of


65. 1941-43 Philippine Folktales, beliefs, popular customs, and traditions. A collection of original source material for the study of the popular literature and native social culture of the Philippines. Selected in May 1941 from the general Beyer collection of original Sources in Philippine
Ethnography, a series of about 150 volumes compiled to Manila, 1912-1940.
  v.1 (Data from the Christian provinces), TS, 430 leaves.
  v.2 (Data from the Christian provinces, continued),
  TS, 475 leaves.
  v.3 (Data from the non-Christian provinces) volume not
  available for examination.

66. 1943  “Philippine tektites and the tektite problem in general,” in Smithsonian
  Institution Annual Report, 1942 (Washington: Gov’t Print. Off.,
  1943), 253-260.
  A reprinting of article which was published in 1940.

67.  1943 Visayans in Formosa in the 12th and 23th centuries a compilation of
  all known source material on the subject. TS, 16 leaves + 1 map.

68.  1943 A brief history of Fort Santiago (with historical notes on the old
  Walled City of Manila), Manila: 1943. TS, 77 leaves

69.  1941-47 Special catalogue of Rizal Province tektites (including all except those
  from Sta. Mesa and Kubao Sites). 1 vol. (as yet incomplete).

70.  1946 Manila were, a study of the Manila were kilns of San Pedro, Makati,
  Rizal Province and surviving examples from other sites. About 30
  typewritten pages + 30 plates

71.  1947 Philippine science loses a friend,” being an obituary of
  Dr. Roy F. Barton, and a review of his work among the Ifugaos, Manila

72.  1947 “Outline Review of Philippine archaeology by islands and provinces,”
  Philippine Journal of Science, v. 77, nos. 3-4 (July-Aug. 1947), 205-
  374. 22 plates + 2 text figs.

73.  1947 Philippine Saga: a pictorial history of the archipelago sine time began.
  Published by the Evening News, 1947 152 pp. With Jaime C. de Veyra as
  joint author.
  Chapters 1-8, 27-28 were written by H. Otley Beyer.

74.  1948 Early history of Philippine relations with foreign countries, especially
  China,” being an historical introduction to E. Arsenio Manuel’s Chinese
  Elements in the Tagalog Language (Manila: Filipiniana Publs., 1948), ix-xxv.
  Reprinted with initial paragraphs deleted in Shubert sc. Liao (ed.,)
  Chinese Participation in Philippine Culture and Economy (1964), 96-113.

75.  1948 Philippine and East Asian Archaeology, and its relation to the origin of the
  Pacific Islands population, Quezon City: Nat. Res. Council of the
  Philippines, Dec. 1948. 130 pp., 32 figs.
76. 1949 Supplementary illustration to the “Outline review of Philippine Archeology by islands and provinces, with a few critical bibliographic notes and preliminary data on new finds. Manila: Privately printed, Nov. 1949. 18 pp., 46 figs.


H. Otley Beyer’s notes are found in the following:
“Preface,” v-vii
Introductory notes, 2 to Part I: Papers relating to Prehistory and Archaeology, 67-68.
Preliminary note,” to Group One: Four messages containing data of scientific interest. 74-75.
Preliminary note,” to group two: Eight papers on Chinese archaeology and early history, 83-88.
Preliminary note, “ to Group Three: Four papers on Terminal note to the group three papers,” 269-275.
Preliminary note,” to Group Five: Nine papers on the palaentology, Prehistory, and early history of the Philippines, 335-337.


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Chronicle Magazine April 15, 1967, pp. 9-12


DR. EMILIO ERQUIZA BULATAO was a distinguished scientist and an indefatigable researchers. His obsession was in the field of Physiology where he dedicated his life intensely. In it he achieved greatness, although he preferred to remain obscure. His humility in refusing to seek honor and glory for himself was mistaken by his contemporaries as extreme shyness.

One of his most outstanding contributions to physiology was a result of his research work with Dr. Anton Julius Carlson. In 1923, he was sent abroad as a Fellow of the Rockefeller Foundation and a Special Fellow of the University of the Philippines. It was during this period of his life that he made a study on the relation of gastric hunger contractions and blood sugar, which was performed in Dr. Carlson’s laboratory in Chicago and is still being cited in standard textbooks in physiology today. As a Fellow, he also performed some experiments with Professor Walter Bradford, Cannon in Chicago, and Professor G. V. Anrep, in London.

Born in San Carlos, Pangasinan, on May 26, 1892, Emilio Bulatao was not destined to be a politician like his father Don Tomas - on time Mayor of San Carlos. His mother, Juana Erquiza, although a politician's wife devoted her time solely to her family.

Dr. Bulatao had an exemplary record throughout his scholastic training. His medical studies were pursued at the University of the Philippines where he obtained his M. I. degree in 1915, after having finished second time in a class of sixteen.

His enthusiasm brought him consistent advancement in whatever positions he held. Immediately after graduation, he was appointed Assistant Instructor in the Department of Pharmacology, Biochemistry, and Physiology of the U.P. Medical School. His ingenuity served him well in Cuyo, Palawan, where as an Assistant Surgeon, he personally trained his assistants and attendants whom he had recruited from the local population.

In May, 1917, he returned to Pangasinan to marry his provincemate, Encarnacion Ungson. Together they went back to Cuyo. In October of the same year, he was promoted to Surgeon of the Philippine Health Service and transferred to the Butuan General Hospital as Resident Physician. Shortly after this promotion, Dr. Bulatao was made the District Health Officer of Agusan Province. Destiny however, had other plans for him. The U.P. College of Medicine wanted to have him back although he had occupied his new position for barely a year. As a result of this, on May 1919, he returned to Manila to become Assistant Professor in Physiology. Teaching of this subject was to become his lifework for thirty-eight years. Dr. Bulatao was appointed full professor in January 1930, and on June 1940, he was made the seventh head of the Department of Physiology and Biochemistry - succeeding the late Professor Isabelo Concepcion. He occupied this position for seventeen years until his illness forced his retirement in January 1957.

Emilio Bulatao was extremely dedicated as a teacher. He imparted his ideas by force of an analytical mind which was at its best in tutorial conferences in his laboratory classes and in advisory consultations on research problems presented to him. A staunch believer
of the philosophy of independent thinking, he developed in his students the correct
technique of experimentation. His scholarly approach in the teaching of any subject is
reflected in the professional competence of many of those who graduated from the U.P.
college of Medicine scattered throughout the country.

The Far Eastern University College of Medicine and the then newly established College of
Medicine of the University of the East - now known as the Ramon Magsaysay Memorial
Foundation, offered a better paying post to Dr. Bulatao but his loyalty to the University of
the Philippines made him stay in the state university.

As a physiologist, he believed in the correlation of the three basic disciplines - physiology,
biochemistry and pathology - with clinical medicine.

The transformation of clinical medicine from empirical art to a scientific discipline
has largely been due to the development of the physiological, physical and
biochemical sciences. Modern clinical medicine seeks to apply basic concepts
to the recognition of disease processes; an understanding of the effects of
anatomic lesions in producing disturbances of normal physiology and the
mechanism by which they express themselves as signs and symptoms. This
correlation of the basic disciplines - physiology, biochemistry, and pathology with
clinical medicine was preached by Dr. Bulatao two decades ago, a concept
which was then thought to be impractical but now accepted as he basis of
modern clinical medicine.

Physiology was not his only obsession. Statistics and chess also fascinated him. In fact, he
had as many books on chess as he had physiology texts. He was an avid chess player
and it was extremely difficult to stop him from playing once he had started a game. His
daughter, Josefina, recalls that the only way to discourage him from playing was to hide,
unknown to him, a chess piece. She did frequently resort to this trick.

Dr. Bulatao was an accomplished statistician and mathematician. What makes this truly
remarkable is the fact that he had no formal training in these advanced sciences except
the elementary knowledge acquired as a high school student at the former Philippine
Normal School. Proof of his mathematical ingenuity may be seen in the formula he
advised for screening applicants to the U.P. College of Medicine. This formula proved to
be of great help in evaluating the grades of students who came from different
universities without a common standard of grading. It is still being used even at present.

As a hobby, and as further evidence of his mathematical zeal, Emilio Bulatao used to
engage in frequent discussion with able mathematicians.

In 1942, when the Japanese forces occupied Manila, Dr. Vital Tan, then head of
the Department of Mathematics and Professor Gokahle, staff member of the
Department of Mathematics, both from the U.P. Frequently met with my father,
primarily to discuss the latest news on the Japanese invasion. They always had a
blackboard in their midst which bore mathematical equations. This was used as a
front in case any Japanese soldier should confront them. But since these three
men possessed a common love for statistics, these gatherings always led to
discussion of statistical and mathematical problems.

During the War Years, the Medical School was kept open and Professor Bulatao
stayed on. He suffered shrapnel injuries during the Battle of Manila. After the liberation of Manila, and with the transfer of governmental authority to the Commonwealth Government, he was again appointed Professor and Head of the Department of Physiology and Biochemistry in the University. With the opening of the Graduate School on May 3, 1948, he was appointed a professorial lecturer. He served his term until his 59th birthday on May 26, 1951.

Dr. Bulatao’s scientific contributions death principally with the physiology of the circulation and studies on some physiological standards of Filipinos. The following are two samples of his numerous experiments:

1. “Blood Pressure Picture of the Filipinos” by Isabelo Concepcion and E. Bulatao:

“The main object of this experiment was to study the normal blood pressure picture of the Filipinos of all ages and of both sexes in order to establish a standard which is believed to be very valuable to clinicians and physicians connected with life insurance companies as a guide in their daily determination of blood pressure.

“Blood pressure readings were made on 697 males and 218 females, making a total of 915 cases. These observations with the exception of 78 cases, were made on Filipinos between the ages of 15 and 87 for males, and between 16 and 45 for females. Of 697 male subjects examined, 585 were convicts in Bilibid Prison and 117 were medical students, nurses, or instructors in the U.P. College of Medicine and surgery. Of 218 females, 128 were convicts and only 90 were nurses and medical students.


This experiment involved the study of athletes from Japan, China, the Netherlands, the Indies and the Philippines, who took part in the Far Eastern Championship Games held in Manila on May 12 – 19, 1934. They were quartered at the de la Salle College and observed for five weeks. Observations on individual Filipino athletes were made once a week – from the time they were quartered until the commencement of the games. Foreign delegations were examined one week previous to and during the championship games. All examinations were made between 8:30 – 11:00 in the morning before the athletes started training. The medical examinations were made by these five scientists:

Dr. Salcedo – blood pressure and pulse rate
Dr. Pascual – pulse rate and erythrocyte count
Dr. Sapinosa – erythrocyte count
Dr. Sta. Cruz – erythrocyte count
Dr. Ocampo – height and weight and vital capacity
Dr. Bulatao – Statistician

Results:
1. Swimmers as a group have the lowest pulse rate and the highest vital capacity.
2. The Japanese swimmers who made the best showing in the tank have comparatively higher red-cell count and vital capacity than their Philippine or Chinese counterparts.
3. Training and quartering show an apparent tendency to lower the pulse rate and blood pressure.
4. Many Filipino athletes from the province, on arriving showed red-cell counts below 5,000,000 but after a few weeks of quartering and training, their red-cell counts increased to 5,500,000 or more.
5. Training and quartering tend to diminish the degree of change in pulse rate and blood pressure ordinarily resulting from changes in position.
6. After completion, whether in a dash a middle distance run, hurdling, swimming short or long distances, the red-cell count increases by 300 to 400 percent, and the blood pressure, 60 to 70 percent.
7. In one case, where the investigation was able to take a carotid pulse tracing, there was no irregularity in pulsation, as far as they could make out, after the athletes had run 400 meters over low hurdles.
8. They made detailed investigations into the athletic history of two of the Filipinos who were participating in the 10,000-meter dash. It seems that the Philippines failure to produce good long-distance runners may be ascribed to lack of long, painstaking and systematic training coupled with the uncontrolled desire of the athletes themselves to shine or make good within a comparatively short period of experience and training.
9. In general, the study showed that results in men athletes are confirmed by similar findings in women.

An accomplished physiologist, Dr. Bulatao deserved every award and honor that was bestowed upon him. From 1923 – 1924 he was sent abroad as a Special Fellow of the U.P. and a Fellow of the Rockefeller Foundation where his scientific contributions to Physiology earned for him an honorary life-membership in the American Physiological society. It was also during this time that he gained membership to the Phi Kappa Phi and the Sigma XI Honor Societies. The Manila Medical Society and the National Research Council were two other important societies of which he was an active member. On July 8, 1951, he was honored with the Outstanding physiologist award of the Manila Medical Society in connection with its golden Jubilee celebration. The U.P. Alumni Medical Society honored Emilio Bulatao as the Most Outstanding Alumnus in 1958. The Argentinian Government invited him to the International Congress of Physiology which was held in Buenos Aires on September 1959. His illness forced him to decline this invitation. During the U.P. Commencement Exercises in April 1961, he was honored with a Gold Medal of Merit and a Diploma of Honor as Distinguished Alumnus of the U.P. This was the last award he was ever to receive in his lifetime.

Among Dr. Bulatao’s scientific works are the following articles; Blood pressure of Filipinos; Influence of experimental changes in blood sugar on hunger contractions (in collaborations as senior author with Anton Julius Carlson, Professor of Physiology, University of Chicago); Effects of temporary anemia on tone of blood vessels;
conditioning of activity of endocrine glands; pulmonary circulation and the heart; Studies an auriculo-ventricular conduction in the heart.”

Although he was a dedicated scientist, Emilio Bulatao did not let his career interfere with his devotion to his family. His four children all grew up to be accomplished in their respective fields of endeavor; Josefina, a Magna Cum Laude graduate of the U.P. College of Medicine, is a Medical Nutrition Scientist at the Food and Nutrition Research Center; Rodolfo is a professor in the U.P. College of Engineering; Elisa is a Senior Statistician in the Bureau of Census; Jaime, the Jesuit priest, holds a Ph.D. in Clinical Psychology from Fordham University and is now the Director of Central Guidance and is also Head of the Ateneo de Manila Graduate School, Department of Psychology.

As a scientist, his work is highly commendable; as a teacher he was dedicated; and as a friend – he was warm hearted. But Emilio Bulatao possessed a distinguished trait that limited his circle of friends to a select few. He had an intense aversion to social gatherings. When he was recommended for the most distinguished alumni award of the U.P. in 1961, the members who submitted his name said of him:

The name of Dr. Bulatao is perhaps unknown to the members of this Board outside of one or two because Dr. Bulatao is a retiring and humble man who has not only failed to broadcast his achievements but has actually belittled them.

In spite of his retiring disposition, Emilio Bulatao was well-liked by his students and colleagues at the U.P. College of Medicine. Their loyalty to him was indeed sincere:

On June, 1952, a month after his birthday, my father served my brother Jaime first mass – after his ordination as a Jesuit priest in Woodstock, Maryland.

This trip was almost touching momento for my father not only because it marked a significant event, but also because it was a surprise birthday present given by the U.P. Medical Alumni Society. They initiated a collection for this purpose and the response was remarkably spontaneous. The Manila chapter started the collection, but word traveled fast and soon even the members from various provinces started sending checks.

More money was received than was actually needed for my father’s fare. With the excess amount they bought some useful articles for him and left some amount for his pocket money.

During his stay abroad, after his son’s ordination, Dr. Bulatao had an opportunity to observe the latest methods of teaching Physiology and Biochemistry since he had been granted a six months sabbatical leave by the University of the Philippines. He reviewed recent advances in these subjects, particularly at Johns Hopkins University and in the medical schools of the City of New York. He, also made short observational visits to the medical schools of Harvard, Yale, Pennsylvania and Chicago.

In 1957, when illness forced him to retire from the work which he had loved so much, Dr. Bulatao found himself still deeply involved in Physiology. Even though bed ridden by the paralysis that was later to claim his life, he devoured every physiology journal that came to his notice.
Dr. Bulatao’s co-professors and former students at the U.P. College of Medicine, in summing up their impressions of him, gave a further insight of Emilio Bulatao – “The Scientist, the Professor, the Man, as follows:

What I know of Dr. Bulatao is that he was a gentlemen, a faithful husband, a good father, a kind friend, a dedicated teacher and a great physiologist.

Deeply effacing, erudite, scholarly, objective, humble, compassionate and considerate of students faults, yet so demanding in the perfection of scientific studies- that is how I remember a beloved professor and friend – Dr. Bulatao.

There were two famous Consuls in Ancient Rome during the two centuries that immediately preceded the birth of Christ. They both belonged to the clan of Aemilius and are remembered as road builders. The late Professor Emilio Bulatao was also a road builder in his own way - he paved the roads which his students were to travel going on their way to the clinics. Among the Teutons, Emil meant work and string - and that was what Professor Bulatao was. He always stove to set an example by precept. He was a devoted family man. He was an ideal academician - erudite yet a man of few word. His logical, analytic mind transplanted problems into simple terms and this helped him teach himself higher mathematics. Thus he was always a source of inspiration to his students.

Professor Bulatao did influence science in the Philippines in his own quiet almost shy way, but nonetheless effectively. The many students he encouraged to perform above mediocrity whom he inspired to dedicate their future in the fields of medical research speak highly of their mentor. Dr. Bulatao was among those selected few Filipino scientists who during the decades before the last war opened the trail of scientific research that was to be followed more aggressively after the Liberation. The trail he himself helped blaze with his own studies, valuable albeit limited, on physiology as affecting our own Filipino people. His fundamental work for instance on age-weight-growth relationships among Filipinos will continue to be studied by those who are concerned with promoting the nation’s health. And the prestige he culled for himself as a Filipino physiologist will no doubt continue to speak well of our potential to achieve excellence in this field of science, as long as we are goaded by the same patient, courage and deep thirst for knowledge as reflected in the many faces of Nature.

When Emilio Bulatao died on May 5, 1961, there were two books found by his bedside – one on Physiology, another on Statistics. They were symbols of his undying passion for two great sciences to which he dedicated his life. To this day his memory lives when once every year, the U.P. College of Medicine honors him with the Emilio Bulatao Lecture.

NOTES

1. That branch of Biology dealing with the processes, activities, and phenomenon incidental to and characteristic of life or of living organisms.
2. For results on this experiment refer to: The American Journal of Physiology, 69 (June 1924), 107-114.
4. Observations on the pulmonary circulation; pulmonary circulation in the heart-lung preparation”. Journal of Physiology, 60 no. 3 (14 July 1925) no. 3.
5. In 1916 he transferred to the Philippine Health Service as Assistant Surgeon and assigned to Cuyo, Palawan, Proceedings of the College of Medicine, U.P. 2, no. 4 (July-August 1953), 174.

6. Ibid


10. Personal Information: Dr. Josefina Jayme, daughter.


12. Personal Information: Dr. Paulo Campos, former student of Dr. Bulatao and now Head of the Department of Medicine, U.P.

13. Personal Information: Dr. Jayme, daughter.

14. On January 2, 1942, the Japanese Army occupied Manila, and on the following day the Japanese Military Administration was established in Manila. By proclamation of the Japanese High Command the Sovereignty of the United States was declared terminated until the Philippines was liberated by the U.S. Forces led by General Douglas MacArthur on January 9, 1945. Gregorio F. Zaide, Philippine Government, Manila, The Modern Book Company, 1955, pp. 102-111.

15. Loc. cit.


18. Results of Studies on aurico-ventricular conduction in the heart are with Dr. Jesus Nolasco, Head of the Far Eastern University Guidance Center. Personal Information: Dr. Jayme, daughter.

19. Copy of the recommendation of Dr. Bulatao for the 1961 U.P. award of Most Distinguished Alumni for 1961 submitted to the Board of Directors, U.P. alumni Society, and signed by 14 members of the U.P. College of Medicine Alumni was furnished by Dr. Josefina Jayme, daughter.

20. He later wrote a moving article about this experience which has helped not a few parents decide favorably when confronted with their son’s permission to enter the priesthood.

21. Personal Information: Dr. Jayme, daughter.

22. In Memoriam” May 25, 1961. Copy furnished by Mr. Jose Teves of the National Research Council Office, Diliman, Quezon City.


24. By Saturnino Ador-Dionisio, M.D. Chief of Clinics, PGH Ibid. p. 177.


26. The first Emilio Bulatao Lecture in Physiology was held on October 6, 1961. The lecturer was Dr. Howard A. Matzke, Professor of Anatomy at Kansas University Medical School. The topic of the lecture was, The application of experimental comparative neuro-anatomy to the understanding of the human nervous system. The second memorial lecture was held on March 9, 1963. The guest, John Raymond Brobeck, Professor of Physiology and Chairman of the Department at the University of Pennsylvania School of Medicine, lectured on “The Study of Physiological Regulations.”

**SCIENTIFIC CONTRIBUTIONS**

3. Observations on the Pulmonary circulation; Pulmonary Circulation in the Heart-Lung Preparation, published in the Journal of Physiology 60 no. 3 (14 July 1925) no. 3.

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1. In Memoriam, May 25, 11961.

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Dr. Josefina Bulatao-Jayme, daughter
Dr. Paulo Campos, former student of Dr. Emilio Bulatao and now Head of the Department of Medicine, U.P.
Dr. Honoria Acosta-Sison, M.d. Emeritus Professor of Obstetrics and Gynecology, U.P.
Dr. Saturnino Ador-Dionisio, M.D. Chief of Clinics, P.G.H. Porfirio Recio M.D. Managing Editor, Acta Medica Filipina.

Sunday Times Magazine, Jan. 29, 1967, 26-29
Nestled at the foot of Mt. Makiling is a complex of building and laboratories which is fast becoming known the world over as the center of agricultural education in Southeast Asia. In recent years, it has attracted the interest and personal visits of heads of states, royalty, prime ministers and other foreign dignities. Hundreds of students from Southeast Asia have studied and are currently studying in what is now known as the University of the Philippines College of Agriculture at Los Baños, Laguna.

This college is closely linked with the memory of Dr. Edwin Copeland. Indeed, it was Dr. Copland who, with uncommon foresight, courage and imagination founded the college on June 14, 1909, and became its first dean. The college initially started with a faculty of four American teachers, and a student body of twelve. By the end of the first year, however, the enrollment had reached fifty-six. Dr. Copeland served the college as dean and concurrently professor of plant physiology for eight years (1909-1917).

The bold and imaginative vision Copeland displayed coupled with dogged determination in the face of obstacles during the establishment and early years of the first agricultural school in the Philippines is typical of the man.

He has built the college in the face of great obstacles and difficulties, and yet has accomplished wonders there in a very few years, Prof. Charles Fuller Baker has states in 1917. And he had faith in the possibilities of the Filipino young men as others have and there have been fine examples of justification of that faith.

He has also held the standards of the college high when there were all sorts of influences at work to pull them down, “Fuller continues. “In other hands, the college might now be a mere farm school, while as it is the institution is moving in the direction of being a real college, a technical school for higher training in agriculture. It would be a tragedy for the islands to lose any of the headway that has been gained through Dr. Copeland’s long and strenuous efforts.”

Dr. Copeland’s steadfastness in the face of difficulties may have been fostered by this strict adherence to thoroughness and discipline. Prior to the establishment of the college, he had mapped out plans which would offset the problems that might jeopardize the project. He paid painstaking and particular attention to every detail of the plan and sought to carry them out with dispatch.

Indeed, to the faculty members under him, he was always kind and obliging; at the same time, however, he never lost sight of the fact that work and official business had to be done in a business-like manner. To his students he was at all times gentlemanly and paternal; at times seemingly difficult and inconsiderate and unsympathetic. And yet it was obvious that her as merely adhering to his system of discipline which he generously used as means to build the character of his students. He often stressed the value of hard work; by actual practice he sought to convert the drudgery of work into a highly desirable and enjoyable virtue.
Discipline and hard work had always been the guiding light in the life of Dr. Edwin Copeland, who was born to Herbert Edson and Alice Bingham Copeland on September 30, 1873, in Monroe, Wisconsin, U.S.A. His interest in botany started in high school during which he accumulated an extensive herbarium of plants in Central Wisconsin could have been influenced by his father, who was a brilliant zoologist.

This interest in science was further developed when after three years of undergraduate work in the University of Wisconsin, young Copeland attended the Leland Stanford Junior University in 1894, which awarded him an A.B. degree in 1895. Dr. Copeland then took up special work in plant and agriculture in Leipzig and Halle in Germany. In 1896, he received his Ph. D. from the University of Halle.

Dr. Copeland joined the faculty of the University of Indiana as assistant professor of botany in 1897-1898. The following year he transferred to the State Normal School at Chico, California as professor of botany. It was in Chico where he met Ethel Faulkner, whom he married on December 19, 1900. The marriage was blessed with five children.

The school year 1899-1901 found Dr. Copeland in the University of West Virginia, and between 1901-1903, Dr. Copeland shuttled from the University of Wisconsin to the University of Chicago to engage in scientific studies. He taught cryptogamic botany at the Gold Spring Harbor Station during the summer of 1901, and was instructor at Stanford University in 1901-1903. In 1903, Dr. Copeland came to the Philippines, and joined the Bureau of Science in Manila as systematic botanist. He subsequently became an instructor of botany at the Philippine Normal School in 1903-1907, later serving as superintendent in the School of Agriculture from 1908 to 1910. At the establishment of the U.P. College of Agriculture in Los Baños, in 1909, he became its first dean, serving in this capacity until 1917.

As first dean of the college’s, Dr. Copeland did not confine his activities to the administration of the school alone. He maintained his continuing interest in Philippine agriculture and its myriad problems. He conducted many studies of the daily growth movement of Lagerstremia. With characteristic thoroughness, he painstakingly recorded his 24-hour period observation of the curvatures of this particular plant caused by its growth. He observed, for instance, that there was no absolute regularity of the rate of growth with the hour curvature relationship. He reported, however, that the growth curvature was more rapid at night than at day time. This, according to Copeland, may be attributed to the interplay between diurnal changes, temperature, influence of gravity and internal directive factors (hyponasty, opinasty and restipetality).

As early as 1917, Dr. Copeland had displayed deep concern for the sugar industry in the Philippines. He observed that, compared to other sugar-producing countries of the world, there was a larger percentage of damage inflicted upon sugar crops by pests and diseases in the Philippine sugar lands. He attributed this to the poor cultural treatment of the sugar cane. He then proposed the adoption in the Philippines of the cultural treatment techniques in other sugar-producing countries in order to reduce the high percentage of damage.

He also noted that the presence of wild sugar canes in the country was conducive to the prevalence of pests and diseases. He warned that unless this was checked immediately there existed the possibility of an epidemic that would doom the county’s sugar industry.
But it is as specialist in ferns that Dr. Copeland is probably best known in the scientific and scholarly world. A recognized leading world authority of the subject, he wrote various articles on the location, distribution and description of ferns not only in the Philippines but also in the Malay archipelago and New Guinea.

Dr. Copeland did research work on some of the new and interesting Philippine ferns. He observed that the Philippine fern Thaveria obtained from Mindanao and Luzon and New Guinea’s T. nectarifera (Baker) belong to the same species. Their differences were not constant, Copeland wrote a three-volume work on the ferns of the Philippines, in which he described and classified the ferns found in the country into families, genera and species.

In the course of his extensive studies on Malay ferns, on the other hand. Dr. Copeland argued that the genera Diplora and Triphlebra actually belonged to the genus Phyllitis. Therefore, Diplora and Triphlebra were regarded distinct and different from Phyllitis, Genus Phyllitis has only three well-defined species in the Malay-Polynesian region.

Dr. Copeland was also instrumental in identifying and determining species of ferns brought to him by the Owen Bryant expedition in Java. For the past half-century, the understanding of systematic pterilogy has been so great that with his numerous papers dealing with details of the subject Dr. Copeland decided to write the book entitled Genera Filicum. According to him, the phylogeny of the fern genera could be demonstrated more clearly and convincingly than that of any similar groups of plants.

But it was not only sugar and ferns which occupied the scholarly interests of Copeland; no less important are his studies and research work on coconuts and rice. Dr. Copeland did research work on coconuts (coco nucifera) at the government farm in San Ramon, Zamboanga. A thorough study of the physiology of coconut palm was undertaken by him, for the purpose of improving the existing methods of the plants cultivation. His systematic discussion of the subject in the research report touched on the root and its structure, growth and the absorption of water, leaf and its structure, the activity of the stomata and transpirations. Copeland concluded his report with his findings of the characteristics habits of the coconut plant and suggested means by which it might be advantageously cultivated.

Copeland also wrote a book entitled Rice. In this work he pointed out that the rice plant is a living thing and should be treated as such. He said that there should be a thorough understanding of the knowledge of the response of the rice plant to the treatment that it receives so that rice growers could tell the whys and how each plant response is made. Dr. Copeland also needed that rice growing is a business, the determining factor of which are quality and quantity of rice. He warned that the adaptability of rice improvements vary from one place to another and therefore practices from whatever sources should be given business consideration by the rice-growers.

A mason, Copeland was a member of scholarly and professional groups which might be mentioned the A.A.A.S. (American Society for the Advancement of Science) of which he was a fellow, the Phi Gamma Delta honor society, the American Society of Naturalists and the Botany Society of America.

Dr. Copeland also served as the director of the Los Baños Economic Garden and as technical adviser in agriculture of the Philippine government in 1932 up to his retirement in 1935. With his retirement, Copeland returned to the United States, but he never lost
interest in the school which he helped build. After World War II, he actively campaigned for aid to help the college back at its feet. And through letters to his former students he kept abreast with the developments of the college inasmuch as “the college can hardly be as dear to anybody else as to me.”

When the college celebrated its golden jubilee in 1959, Copeland sent a message. After fifty years I must use the mails to send you my greetings, he wrote with a tinge of sadness. I had hoped to be with you in person, but congratulations are no less sincere because of the ocean between us .... I take the greatest pride and satisfaction in the part I was given to play in the establishment of the College,” he added and voiced the hope that the College will “always prosper and continue to be a vital force in the development of the Philippines.

Nevertheless, Copeland was able to return to the Philippines to receive an honorary doctorate degree from the University of the Philippines in recognition of his pioneering work in Philippine agricultural education and research. On June 26, 1959, at special convocation during the golden jubilee celebrations of the college, then U.P. President Bienvenido Gonzales read the citation.

Dr. Copeland, the citation pointed out, was scientist, author, scholar, linguist, founder of the College of Agriculture of the University of the Philippines, mentor and inspirer of the Filipino youth toward higher planes in scientific endeavor.

Copeland was also cited for having given encouragement and direction to hundreds of young Filipinos who for the first time took technical, agriculture and allied scientific disciplines as a career, and for having opened to qualified Filipinos scientific and technical positions of trust and responsibility in defiance of the policy then prevailing. The citation added that Copeland was the founder of the Philippine Agriculturist, and was co-founder of the Philippine Journal of Science, aside from being the world’s leading authority on ferns and being the author of many scientific articles and technical books of a high order of excellence.

The citation, thus, underscored Copeland’s signal contribution to the cause of science in the Philippines, and expressed the deepest gratitude of the country and its scientists, adding that the University of the Philippines has always remembered you as one of its builders and in doing honor to you ... pays homage to one who is dearly reversed and loved.

At the death of Edwin Bingham Copeland on March 24, 1964 in Chico California at the ripe old age of 90, the then Dean Dioscoro L. Umali of the U.P. College of Agriculture wrote his son Herbert:

Every time we think of the College, its buildings, its present growth, its recognized role in agricultural education in the Philippines and other regions of Southeast Asia, we think of your father. Without him the college would not have reached the stature that it has at present. I am sure that everyone in the college realizes the foresight, vision, and dedication of this institution... He can never leave us, for all around us and we ourselves are living testimonies to his greatness.

Indeed, Dr. Copeland’s pioneering spirit, keen foresight, rugged determination and unshakeable faith in the capacity of the Filipino youth is a constant source of inspiration and emulation. Fifty years ago, he may not have dreamt of a college that today
beckons to students not only from all parts of the Philippines but also from Malaysia, South Vietnam, Thailand, Pakistan, India, Burma and indeed the whole of Southeast Asia. Today this is a reality: more than half a century since its establishment, the U.P. College of Agriculture has grown into a reputable and well-known center of agricultural research and education. Equally important, hand in hand with the development of the college modem techniques of farming have gained significant foothold in Philippine agriculture.

But the cornerstone and the foundations had been laid long before by an American whose gallant efforts and contributions this nation gratefully acknowledges and whose name still lingers in the hearts and minds of a grateful people: Dr. Edwin Bingham Copeland.

NOTES
4. Loc. Cit.
5. Loc. Cit.
6. Ibid., p.
7. His family on both sides has been in America since the days of the American revolution, Ibid., p. 3.
8. In 1894 the Leland Stanford Junior University, are popularly known simply as Stanford University was beginning to offer special advantages in scientific work. Loc. Cit.
12. Copeland was succeeded by Charles Fuller Baker, Bienvenido Ma. Gonzalez (who later became President of the University of the Philippines), Francisco O. Santos, Leopoldo B. Uichanco and Dioscoro L. Umali. Umali, op. cit., p. 21.
14. Ibid.
16. Ibid.
17. In 1906 he published a key to the families of flowering plants and ferns in the Philippines. This was published in Bulletin No. 24 of the Bureau of Education with an outline of a year’s course in Botany. See The Philippine Agriculture and Forester. Vol. VI, No. 1 (September 1917), p. 3. For his published works on ferns see “Scientific Contributions”.
21. Copeland published a book entitled Coconut in 1914, which will probably remain the standard work on the subject for some time to come. For his other works on coconuts, see “Scientific Contributions.”
24. Weissblatt, op. cit., p. 41.
26. Ibid., p. 4
29. Ibid.
30. Ibid.
31. Personal correspondence of Dean Dioscoro L. Umali with Herbert Copeland, son of Dr. Copeland.

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**SCIENTIFIC CONTRIBUTIONS**

**Coconut**

1. 1911 “Physiology of the coconut,” The Philippine Agriculturist and Forester, vol. 1, No. 3: 44-50
2. 1912 “Review: Pests and Diseases of the coconut palm” by W. Frogatt. The Philippine Agriculturist and Forester, vol. 11, nos. 4-6: 106

**Sugar Cane**


**Fiber Plants**


**Cacao and Coffee**


**Root Crops**

11. 1911 Maniok Varieties,” The Philippine Agriculturist and Forester, Vol. 1, no. 1:22
12. Root Crops: the Philippine Agriculturist and Forester vol. 1, no. 2: 23
Other Plants

Agricultural Botany

**Plant Pathology**

**Fertilizers and Fertilization**
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Personal information furnished by:
Dean Dioscoro L. Umali correspondence with Herbert Copeland, son of Dr. Copeland.
OF the three children born to Aniceto Faustino (b. April 17, 1872) and Candida Alcaraz (d. 1909), the first was Leopoldo, followed by Antonia and Jose, who all saw the first light of day in Calamba, Laguna province. The father, who came from Bacoor, Cavite, had finished the third year of *latinidad* at the Colegio de San Juan Letran, Manila. There is some indication that the family was somewhat well-off.

During his teens Faustino’s father moved to Calamba where he served as an acolyte to the parochial priest and where he met his future wife. Aniceto must have married Candida during his late teens, for Leopoldo was born on November 15, 1892. Aside from attending to the family and household chores, Candida occupied her time as a seamstress. Aniceto Faustino had engaged in local politics during the American period and was elected municipal councilor of Calamba.

Leopoldo was a cheerful youngster and his company was sought by other boys of the neighborhood. He loved to narrate tales, though he did not participate much in the folk games, his only favorite game being chess. Leopoldo learned his first letters from Soledad Rizal, one of the sisters of the national hero. He received his early formal schooling from the Calamba elementary school recently established in the town. He continued his secondary education at the Laguna High School, located in Santa the provincial capital, but for some reason or the other, he transferred to Pasay and finished high school there, staying with an uncle named Conrado Alcaraz.

Leopoldo Faustino next enrolled in the University of the Philippines, the date being uncertain. It is also not known how long he stayed in the university, for sometime in 1912 he left for the U.S.A. without an undergraduate degree and without his father’s consent, though he had some 300 pesos in his pocket. As memento of his first years in the university, he contributed two short articles on folklore to the College Folio, the brainchild of a professor of English, Dean S. Fansler – attempts which recall his boyhood interest in local traditions.

In Columbus, Ohio, Leopoldo Faustino got employed in the Western Union Telegraph Co. as office messenger at 15 cents an hour, by working in the evening; then he served as delivery clerk at 45 dollars a month. He worked hard and had ambition; he took a civil service examination in Columbus and placed 5th. Although the kind of examination cannot be determined, this eligibility facilitated his employment in the Ohio State Highway Department, while working on Sundays in the Western Union. When he had accumulated enough cash, he enrolled in the Ohio State University. He soon attained the rank of major in the cadet corps, which gave him 50 dollars a year. He attempted to combine in some efficient way working and getting an education, for he was always in need, though now and then financial help came from home – aunts and a grandfather transmitting money to him. In 1917 he was appointed assistant in the mining department of the College of Engineering, a job which gave him an extra income of 30 dollars a month. He received the degree of bachelor of engineering from that institution in 1917.

Faustino returned to Manila sometime in 1918. There is no record of the date of his having joined the Bureau of Science, though his first employment was as a junior assayer. He contributed several short sections to Mineral Resource of the Philippine Islands, 1917-1918,
his first to technical writing. In the same year of his arrival in Manila he enlisted in the
Philippine National Guard, a training contingent from which men were drawn for fighting
in the European front during World War I. He was commissioned lst lieutenant in the
Engineers Corps, though he never set foot on European soil.

In 1920 Faustino was appointed lecturer in metallurgy University of the Philippines. In the
Bureau of Science, he successively held the position of junior assayer, assistant geologist
and chief geologist in the division of mines. In 1921 he was appointed by Governor
General Wood to evaluate the coal mines claims of Uling- Naga, Cebu, between two
large mining companies, his report served as basis for settling the conflicting claims.

In the same year, 1921, he was sent to the U.S.A. as a government pensionado. He
enrolled at the Ohio State University, where he received a degree in mining engineering
in 1921 and M.S.M.E. in 1922. Then he move to Stanford University, California, where he
obtained his M.A. in 1922 and Ph D. in 1924, presenting Coral of the Philippines for a
dissertation. He had as professors some of those who trained Herbert Hoover as mining
engineer. Faustino meanwhile had his field training under an assistantship in the U.S.
Geological Survey while schooling, 1921-24. It was in Washington, D.C., where he met the
beauteous Paz Pamintuan belonging to a well known family of Angeles, Pampanga
province, a friendship which flowered into romance.

In 1924 Faustino returned to the Philippines, becoming consulting mining engineer for
Cebu Portland Co. in 1925. It was during this return home that he prepared two
pioneering studies - “Geographic and Physiologic Description of the Philippine Islands”
and “General Geology and Geologic History of the Philippine Islands” – for the Mineral
Resources of the Philippine Islands, 1924-1925. In the same volume a historical article was
contributed entitled “Philippine Mining from American Occupation to the Present. 1024,
which though undocumented; must have been based on primary sources filled in his
office, the division of mines of the Bureau of Science where he was chief geologist.

His services were once more needed by the department of geology, University of the
Philippines, where he was appointed lecturer in geology 1926-1930. In 1926, Faustino was
named one of the Philippine official delegates to the third Pacific Science congress held
in Tokyo, October 30-November 11, during which occasion he read a number of
significant papers. Among these were “The Mesozoic Formations of the Philippine
Islands,” Boundary of the Pliocene and Pleistocene Deposits in the Philippine Islands,”
and “History of the Strand Line of the Philippine Islands During the Pleistocene and Post-
Pleistocene”.

More significant works were forthcoming. In 1927 his Recent Madreporaria of the
Philippine Islands”(1928) was published, the first of its kind that summarized the extent and
nature of the known natural resources of the country. Another major contribution that
appeared during the year was Summary of Philippine Marine and Fresh-Water Mollusks
(1928, as Monograph 25 of the Bureau of Science, which opens with a dash of both the
journalist and the scientist:

It has often been remarked that the Philippine Islands has furnished the greatest
variety of sea shells of all the marine provinces comprising the Indo-Pacific region.
In all parts of the world, wherever collections are found, Philippine shells are
numerous. The Islands have long been famous for their molluscan fauna, and the
fact that many generic and specific forms culminate there supports the
conclusion reached by several writers that the Philippine Archipelago is the
nucleus of the whole region. The province is rich, not only in marine forms, but also in land shells. Gorgeously colored shells are not uncommon, and some of the finest and handsomest forms in European collections came from the Philippine Islands.

Then in 1929 Faustino was named member of the Philippine delegation to the Fourth Pacific Science Congress held in Java, May 16-25, during which assembly he presented two papers: “Living Coral Reefs of the Philippine Islands” and “Drilling on Limestone Reefs in Cebu, Philippine Islands. It was in this conference that he became a member of the International commission on Oceanography of the Pacific Science Association.

In 1930 Faustino was appointed acting director of the National Museum, and in the following year 1931, he represented the Philippines at the 1931 International Colonial and Overseas Exposition held at Paris, serving at the same time as technical director of exhibits. He lectured for a while at the University of Santo Tomas, in 1932. Then he was named chief of the National Museum division in 1933. In the succeeding year in 1934, he was chief of the division in mineral resources, Department of Agriculture and Commerce; then was appointed assistant director of the Bureau of Science in September 1934. Among minor positions that he filled was a membership in the Board of Examiners for Mining Engineers, 1927-30 and 1934.

Although Faustino has his training mainly in geology and mineralogy, in which fields he had substantial contributions, he developed his interest in coral and coral reef studies, to which he had a number of major works from his doctoral dissertation onwards. His attention branched out into other aspects of marine life such as in the study of shells, both sea and land. As a geologist Faustino took some interest in Philippine volcanoes, though his contributions are minor as are also his studies on underground water supplies for Manila. In palaeontology, his main contributions lay in his studies of fossil shells as demonstrated in several articles and especially in his Summary (1928).

Faustino was married to Dr. Paz Pamintuan (born in 11894) on February 15, 1926, by whom he had four children Carmen, Erlinda, Milagros; and Jose Luis. As his bride was a Roman Catholic, he had to forego Masonry before his marriage. In March 1935 Dr. Faustino went to the famous Mayo clinic in Minnesota and had himself examined; he was found suffering from cancer of the brain. He returned home in August 1935 and died of the disease on November 8, 1935. His remains were interred in the mausoleum of the Pamintuan family at Lo Loma, Manila.

In his middle and later years, Dr. Faustino manifested a love for the arts – painting and music – and he went to the opera. He did not smoke. Among boyhood friends were Vicente Lim and Leopoldo Uchanco, who later on became well known figures in their chosen fields. Jose Feliciano, though his junior, was both a friend and colleague. Both being geologists, now and then they teamed in their field work and investigations, the latter acting as one of his wedding sponsors in 1926.

The following societies admitted him as member: Sigma XI, Palaeontological Society of America, American Macalogical Union, Conchological Society of Great Britain and Ireland, Philippine Science society,. He was a charter member of the National Research Council of the Philippines, being active in its “Astronomy”, “Geology” and “Oceanography” sections.

E. Arsenio Manuel
NOTES

1. The oldest among three children of Anselmo Alcaraz, a native of Calamba, the next two being Engracia and Silvera. A. Alcaraz was a money lender and peddled mats, hats and baskets for a living. It is calculated that Aniceto Faustino married Candida sometime in 1890.
2. “Scientific Contributions” appended to this sketch.
3. Ibid
4. A mimeographed copy of this work used to be available in Dr. Jose M. Feliciano’s private collection.
5. For detailed listing, see “Scientific Contributions” at the end of this essay.
6. All these were published in Pan-Pacific Science Congress Proceedings, Third, Tokyo, volume 2 (1926). See “Scientific contributions”
7. See “Scientific Contributions”
8. Quoted from his “Introduction,” P. 3
10. See “Scientific Contributions,”
11. Ibid
12. Due to difficulties in locating them, only a couple of articles on the subject are listed in our “Scientific Contributions,” which is the most exhaustive so far attempted.
13. Two articles on water supplies are listed in our “Bibliography”.
14. See “Scientific Contributions”.

SCIENTIFIC CONTRIBUTIONS

1. 1911 “The Four Stones of Cavinti”, College Folio, v. 2, no. 2 (Oct. 1911)
7. 1921-23 “Coal”, in Mineral Resources of the Philippine Islands, 1921-1923 (Manila: Bu. of Printing), 31-40
10. 1924-25 “Geographic and Physiologic Description of the Philippine Resources of the Philippine Islands, 1924-1925 (Manila: Bu. of Printing), 26-40.

Description covers Luzon, (Western Cordillera, Great Central Plain, Cordillera Central, Cagayan Valley, Eastern Cordillera, Southwest Volcanic Region, Southeast Volcanic Region), Masbate, Mindoro, Palawan, Panay, Negros, Cebu, Bohol, Leyte, Samar, Mindanao, (Zamboanga Peninsula, Lanao-Bukidnon,


17. “Petroleum,” Ibid., 116-119


20. 1926 “Stratigraphy of the Coal Measures of the Philippine Islands,” Pan-Pacific Science Congress Proceedings, Third, Tokyo, v. 2 (1926), 1535-1539, with tables.


23. “The Coal Resources of the Philippine Islands,” Ibid., v.2


28. 1927 “General Geology and Geologic History of the Philippine Islands,” in The Mineral Resources of the Philippine Islands for 1924 and 1925 (Manila: Bu. of Printing), 41-43 with map and table.


33. 1928 “Correlation of the Tertiary Formations of the Philippines with those of Europe, Asia and America,” Philippine Journal of Science, v. 35, no. 2(Feb. 1928), 119-125. with 1 table

34. The Natural Resources of the Philippine Islands, Manila Oriental Commercial Co., 11928. 144 pp. Illus., tables, maps.


Author recommends: 1) construction of bridges over all road crossings to eliminate disasters, (2) certain portions of Mayon Volcano now classified as public land should be withdrawn from entry, as these are not safe on account of sand and gravel and boulder floods which may come at any time without previous warnings. It would be desirable to declare Mayon as a public park; 3) establishment of a seismograph station to warn people and give them sufficient time to flee for safety.

43. 1931 “Two New Madreporarian Corals from California,” Philippine Journal of Science, v. 44, no. 3 (March 1931), 285-289, with 1 plate.

A preliminary report under the International Commission of Pacific Science Congress on the Study of Coral Reefs and Coal-reef Phenomena.


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"Bibliographical Data and Bibliography of the Works of the Members and Associates of the National Research Council of the Philippine Islands, “ in its Bulletin No. 7 (Feb. 111935), 655-658.


11. Unpublished materials:
Univ. of the Philippines Service Record No. 11, consulted before world War II.


11. Personal Information and opinion furnished by
Prof. Jose M. Feliciano and Prof. H. Otley Beyer. Before their death.
MEDICAL luminaries have appeared in the local scene, giving credit to their profession and to their country. Looming large over them is Dr. Proceso Gabriel, whose place in Philippine medical history is secured by his significant contributions to public health and to medical literature, by his creative innovations in medical education, and by his dedicated work in his clinical laboratory.

Less known was his philanthropy which made possible the training of talented, promising, but impoverished medical students, who eventually made names for themselves in their chosen profession. As if all this were not enough, Dr. Gabriel is also credited with improvising a sterilizer for curing tobacco, which is still in use by a cigar factory.

But it is as medical doctor that Dr. Gabriel made his greatest impact on Philippine life. At the turn of the century, Dr. Gabriel took a lead in the eradication of cholera; dysentery and typhoid epidemics, which decimated large portions of the population. His work on beriberi, the dreaded disease that took a heavy toll on the young, greatly helped reduce infant mortality while his work in his clinical laboratory, the very first to be established in the Philippines resulted in his extensive writings on the bacteriology of leprosy and tuberculosis.

Set against the backdrop of the times, such achievement, any way one looks at it, was outstanding; indeed. The University of the Santo Tomas Faculty of Medicine, established barely twenty-five years earlier in 1871, helped mould the doctor that Gabriel was to become. The uncertainty of the times, caused by factors which were to lead to the establishment of the very first republic in Asia, did not deter the determined young man to pursue his medical career.

By March 1898, or two years after the momentous cry of Pugad-lawin, which signaled the eventual breaking of the umbilical cord which tied the colony to the motor country. Gabriel had finished his second year of the medical course. Earlier, in 1895 he had obtained the Bachelor of Arts degree from the Ateneo de Manila, at great sacrifice on his part. For he came from a family of limited means, having been born the second of five children to Juan Gabriel, a poor leather dealer, and Juana Bautista on July 2, 1887 in Santa Cruz, Manila.

Of his professors at Santo Tomas, he fondly remembers Dr. Rogelio Aycart, upon whose invitation he used to accompany in his daily rounds of the Military Hospital. By that time, the Spanish-American War had erupted and an emergency hospital was established in the residence of Dr. Mariano Limjap at the foot of the Ayala Bridge and in the adjacent storehouse, the first floor was used for the wounded officers, where an operating room was fitted up, while in the adjacent storeroom, the sailors who were wounded in the sea fight (i.e. during the mock battle of manila between the fleet of Admiral Dewey and that of Admiral Montojo on May 1, 1898) were taken care of.

The treatment was simple. As Dr. Gabriel was to recall later on:
The treatment then in use was the antiseptic and not the septic method. To sterilize the instruments before the operation they were placed in a 100% carbolic solution for about half an hour. At that time the use of rubber gloves was unknown.

Dr. Gabriel went on to say that for the disinfection of the operator’s hand, a 1:1000 solution of corrosive sublimate was used. For the routine treatment of wounds, the following procedure was employed. In case of recent wounds 1) clean the wound with corrosive sublimate solution of a 2% carbolic acid solution; 2) cover the wound with a gauze; and 3) dust with iodoform. Sometime the iodoform gauze was used for drainage.

It was also in this same emergency hospital that Dr. Gabriel saw, for the first time, all kinds of wounds produced by sharpnels, from the very slight to the very severe which necessitated in many cases the amputation of the extremities affected. His frequent observation of tetanus cases among the wounded made him realize why tetanus occurred so frequently.

Towards the end of May of the same year, Dr. Aycart appointed Dr. Gabriel and another fifth year medical student to look for a site in Pasig where the Emergency Hospital could be transferred. The plan was, however, abandoned due to the outbreak of the revolution and the capture of the town by the Filipino revolutionists.

The Emergency Hospital was later transferred to the Conference Hall (Salon de Actos) of the San Juan de Letran College. It was in this building, Dr. Gabriel recounted, “that I saw an extraordinary feat, the operation of the region of upper third of the humerus with good results following a comminuted fracture. It was also here that he observed several cases and different kinds of wounds and a gangrene of the extremities.

Meanwhile, the Philippine-Spanish war raged on. Nevertheless, in the thick of war Aguinaldo proclaimed Philippine Independence on June 12, 1898 in Kawit, Cavite. A year later, despite reverses on the side of Filipinos, Aguinaldo proclaimed the Philippine republic at Malolos in 1899. Subsequently, the revolutionists established the Universidad Literaria de Filipinas in Malolos in March 1898, which offered courses in las, pharmacy, surgery and medicine.

In spite of the uncertainty of the times. Gabriel was determined to continue with his medical studies. He left for Malolos in December 1898 and matriculated in the Universidad Literaria de Filipinas” as third year student, with Dr. T. H. Pardo de Tavera as his major professor. Gabriel was to recall later that Dr. Pardo de Tavera” gave him a dozen lectures on Materia Medica and Therapeutics in his house on Calle Raon.

In March 1899, upon the recommendation of Pardo de Tavera Gabriel worked as clerk in the Bureau of Health which was then located in the Provost Office.

Later on, when American rule was more or less firmly established, Gabriel was appointed as a “practicante” (i.e. laboratory aide) in the then newly-established municipal laboratory by the Americans which was under the directorship of Dr. William Calvert. It was in this laboratory that Gabriel got acquainted for the first time with laboratory techniques which contributed so much to his professional career. He, however, resigned his position on August 1, 1901 to continue with his medical studies.

He graduated as a Licentiate in Medicine and Surgery from the University of Santo Tomas on January 14, 1903. A few days later he took the medical board examination and in
that same year was given a certificate by the board, the very first to be issued by that body. He was employed as municipal physician by the Bureau of Health on August 12, 1903, also serving as municipal health officer in the Districts of Meisic (Binondo) and Tondo under the supervision of Dr. Luis Abella. As health officer stationed in Tondo, his eldest son Antonio was to relate later, Dr. Gabriel would order the disposal of spoiled fish and shrimps in the market, by returning to the vendors the capital that they lost. He thus won the respect and cooperation of the vendors, which enabled Dr. Gabriel to ban effectively the sale of spoiled foods in the market, which was his intention in the first place.

Dr. Gabriel married the former Carmen Borja, the eldest daughter of a well-to-do merchant, on November 26, 1905. Out of this union were born five children, all prominent figures in their chosen professions: Dr. Antonio Gabriel, head of the Department of Preventive Medicine, Microbiology and Parasitology and chief of the Section of Legal Medicine and History of Medicine, Faculty of Medicine Surgery, University of Santo Tomas; Sister Maria Carmencita, Maryknoll College, Baguio City; Dr. Gregorio Gabriel, late assistant dean and chief of the section of Anatomy of the Faculty of Medicine and Surgery, University of Santo Tomas; Dr. Pedro Gabriel, chief chemist of YCO Paints, Elizalde and Company, and prominent professor of philosophy at the University of Santo Tomas; and Angel Gabriel, assistant vice-president of F.G. U. Insurance group.

While in government service, Dr. Gabriel devoted part of his time to teaching. In 1907 he was appointed assistant professor of Histology and later of Preventive Medicine Microbiology and Parasitology. He also served as head of the later department until his appointment as assistant dean of the Faculty of Medicine at the University of Santo Tomas. He was partly responsible for the modernization of the medical curriculum and for the admission of women students in the Faculty of Medicine at Santo Tomas. His students in the Faculty of Medicine at Santo Tomas. His students especially the poor, loved and venerated him. As assistant dean of the college, he aided impoverished students by paying in part or in full their matriculation fees; thus, many young men became physicians through his generosity.

He served as member of the committee for the study of infant mortality. This committee was created by Act No. 2116 enacted on February 1, 1912, for the purpose of studying the causes of high infant mortality in the Philippines and to submit the recommendations necessary to remedy the condition. It was originally constituted by Dr. W.W. Musgrave, as chairman, and Drs. Proceso Gabriel and Luis Guerrero as members. On February 11, 1913, Act No. 2246 was approved extending the terms of the committee members and at the same time increasing the number of its membership to five. Accordingly, Drs. Jose Albert and Joaquin Quintos were appointed as additional members. The committee worked for about two years and submitted an extensive report which was published in 1914. The efforts of this committee contributed to the use of rice bran in the form of cakes (calamay), which was given to patients who were deficient in vitamin B, as a remedy for beri-beri.

Dr. Gabriel was also a member of the committees on typhoid, on leprosy and tuberculosis. Many of the recommendations of these committee, needless to state, were carried out. And while simultaneously serving as municipal health officer of Manila. Dr. Gabriel was also a member of the Council of Hygiene under the chairmanship of Governor Leonard Wood, and of the parole board for the release of negative lepers.
In spite of his busy schedule, as physician and member of different medical committees and as medical educator, Dr. Gabriel still found the time to author scientific literature written through the span of almost a quarter of a century.

As professor of medicine, he wrote Manual de Laboratorio Clinico, the first textbook on this specialty in the Philippines which was published in 1915. And for the benefit of pupils in the intermediate grades he published in 1923 Simple Manual of Hygiene and Sanitation. This book was published as stated in the foreword for the “purpose of imparting rudimentary knowledge of hygiene and sanitation to the children of today who will be the men of tomorrow. It is but an expression of our desire to contribute something to the dissemination of knowledge of hygiene and sanitation and to help in the proper formation of sanitary habits of our people”.

Manual of Hygiene and Preventive Medicine (1927) is a second revised edition of Gabriel’s manual de Medicina Preventiva y Sanaticion, edited earlier in 1922 and had been in use for many years as textbook in the Faculty of Medicine and Surgery in the University of the Santo Tomas.

In 1909, Dr. Gabriel opened a private bacteriological laboratory on 731 Calero Street, Manila, the first to be established by a Filipino. He manufactured an autogeneous vaccine, the first biologic product produced in the Philippines. Destroyed during the liberation of Manila in 1945, this laboratory was rebuilt under the direction of his son Antonio and was relocated in 1053 Oroquita St. after the war.

A private physician to the El Oriente Cigar Factory since 1919, he was attending physician from 1924 until his death in the Flor de la Isabela Tobacco Co. It was during this period that he displayed still another facet of his creative ability when he improvised a sterilizer for curing tobacco, a device which is still used by the Tabacalera Cigar Factory.

One of the highlights of his career took place in 1909 when he won a prize during the Golden Jubilee celebration of the Ateneo de Manila for his work on “Parasitos Intestinales de Filipinas y su Influencia en la Salud Privada y Publica.” Divided into three principal parts, this monograph discusses the concise and detailed zoological description, habitation, evolution of intestinal parasite, symptoms and treatment of diseases that they cause; their influence on public health: and finally, medical practices that should be adopted to diminish the enormous proportion of parasitic infections among the lower strata of society, particularly among farmers. In this work, Dr. Gabriel suggested the proper disposal of wastes and the use of footwear as measures preventing the rapid multiplication of parasites.

Dr. Gabriel was also the recipient of other honors and was a member of various scientific and medical societies among which may be mentioned the Colegio Medical-Farmaceutico de Filipinas; the Philippine Islands Medical Association; the National Research Council of the Philippines and of the Philippine Auxiliary Committee on the Revision of the United States Pharmacopedia.

Dr. Gabriel was also a prominent member of socio-religious societies like the Caballeros de Santa Cruz, Orden Tercera de Santo Domingo, Archicofradia del Santo Sacramento de Santa Cruz, Accion Catolico de Santa Cruz and the Congregacion Mariana.

A heart failure on November 4, 1935 wrote finis to a life fully lived by a man who contributed immensely to the advancement of medical science in the Philippines, who
Dr. Gabriels' untiring and selfless dedication to his chosen profession will always serve as a lasting inspiration to all those who will follow in his footsteps.

NOTES

1. Personal Information from Dr. Antonio Gabriel son of Dr. Proceso Gabriel.
2. Later renamed Sternberg Hospital. I used to be located in Arroceros Street. He was destroyed when the Americans liberated Manila from the Japanese in February 1945.
4. Loc. cit.
5. Loc. cit.
8. As a result of the war, the university functioned only up to April 1899.
10. Personal information from Dr. Antonio Gabriel.
12. Personal information from Dr. Antonio Gabriel.
15. See “Scientific Contributions”, below for the titles of Dr. Gabriel’s contributions to scientific literature.
17. Personal information from Dr. Antonio Gabriel.

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7. 1914 Philippine Islands Committee for the investigation of excessive infant mortality in the Philippines. Report of the government committee
for the investigation of excessive infant mortality in the P.I., Manila, Bu. Printing 1914.


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II. Personal information furnished by:

Dr. Antonio Gabriel, son of Dr. Proceso Gabriel.
Authority in Tropical Medicine

At one time in a certain hospital in Manila, the doctors were baffled by a case the diagnosis of which was too elusive for them. The patient lay prostrate with continuous high fever and painful joints. Came the “Old Guard” and while still a few paces away from the bed, he diagnosed meningitis. A spinal tap was done on the diagnosed meningitis. A spinal tap was done on the patient and it revealed a frankly purulent spinal fluid.

Thus as Luis Ma. Guerrero’s memory to live, long after he had died. He possessed an amazingly keen memory and a pair of clinical eyes which aided him in making a snap diagnosis – rarely using a stethoscope. Dr. Guerrero’s diagnostic ability was termed legendary for he oftentimes could visualize what many physicians failed to recognize. His unusually sharp sense of perception was a distinguishing mark through which he had achieved fame.

Oftentimes, he would enter a patient’s room, glance at him and take his pulse. After a moment of intense concentration he would give his diagnosis.

He was the clinician with the famed clinical eye. His physical senses were acutely attuned to the recognition of illness. One would on ward rounds, for instance, spot him with eyes closed intently listening to the apparently baffling of his finger nails. Then for a minute view, with the searching lenses of the practiced eye, that was worth hours of observation for the neophyte. With see through the interior in an unobstructed view, his eyes, human bodies perhaps appeared like structures on cellophane where he could clearly. Then would come out snap diagnosis or the suggested crucial clue that eventually led to the diagnosis.

As Carmelo Jacinto recalls, the famous doctor diagnosed diphtheria by the character of the patient’s tongue or his body odor; pneumonia by the patient’s nostrils; peritonitis, by the pinched face of the patient’s; tetanus or meningitis by the type of the spinal curvature.

Luis Guerrero was not a brilliant student but he had a strong sense of determination. His uncle, Dr. Leon Ma. Guerrero, the famed Botanist, once chided him when he failed in mathematics: A Guerrero never fails. This challenge was not left unheeded. The next term he received an excellent mark in the subject. Through years of patient toil and persistent effort he graduated in 1901 from the University of Santo Tomas with eight others.

After graduation he served as chief, of the Division of laboratories of the San Juan de Dios Hospital. A year later he was appointed instructor in bacteriology and parasitology at the University of Santo Tomas his merits were widely recognized and he was invited to join the teaching staff of the newly opened Philippine Medical School, as Instructor of Tropical Medicine. This was in 1908. Years later Luis Guerrero succeeded Dr. Ariston Bautista Lin as head of the Department of Medicine of the Philippine General Hospital.
Dr. Luis Ma. Guerrero was an uncontested authority on Tropical Medicine, Bacteriology and Pediatrics. He was appointed professor in Clinical Pediatrics in the University of Santo Tomas and later succeeded Dr. Joaquin Quintos as head of the Department. After repeated requests by the University authorities, he accepted the deanship of the college of Medicine.

It may be of interest to note that conditions in the Philippines had changed during that time. Prosperity under the benevolent American regime was the air. Epidemics of dreaded communicable diseases were being controlled through improved sanitation and hygiene. Infant mortality was dropping because of the pioneering work of Drs. Bautista, Luis and Manuel Guerrero, Quintos, Albert, and Vedder. The life span of the Filipinos was significantly lengthened. Cases of mal-nutrition and the scourge of parasitic diseases were diminishing. Closer contact with the rest of the world brought in an increased dosage of scientific knowledge thus resulting in the greater progress of medical sciences in the Philippines. The faster pace of life, however, led to a greater stress and strain of living which was made use to more wear and tear on the part of the individuals. Emphasis now shifted from communicable diseases and mal-nutrition to degenerative afflictions that accompany the prolongation of life. The amount of knowledge became much more than could be profitably assimilated by a single individual. Subject matter in any field of specialization was growing so voluminous that the physician had to concentrate on narrower fields. The time had come for specialization among Filipino physicians.

Dr. Guerrero, however, did not confine his energies and talents to just one specialized field. He was to attain distinction as a pediatrician, as a laboratory worker, as a helminthologist, and as an authority in tropical medicine. He was known as a very distinguished clinician, and a ranking scientist. Excellence as a medical scientist and practitioner were to come to him as a fruit of his sincere love for wisdom and his fellowmen.

One of his chief virtues as a doctor and professor of medicine was his noble spirit of self-sacrifice for ailing mankind. It was a common knowledge that a good number of times, he was assailed by abdominal pains or colic while prodding patiently on, and administering the sick. He would take his meals, which consisted mainly of a can of “Bear Brand” milk. In his car, just so he could carry out his heavy daily schedule of visits. He knew the moral imponderable, curative value of the presence of the physician — and his presence to many patients radiated and infused confidence, hope, redemption.

Social prominence was of no importance to Luis Guerrero. For him, there were no rich or poor — only the suffering who needed to be alleviated from pain.

A politician once called my father to treat his wife. The senator and his wife were dressed in expensive silk lounging robes. He introduced themselves with an unmistakable tone of importance. My father, obviously unimpressed, answered, very calmly: Hindi ko kailangan malaman kung sino kayo. Kailangan ko'ng malaman kung ano ang sakit ninyo.

Patients had a fanatical faith in him as revealed in the passage:

During one of the visits with the Osmeñas he heard two of the children coughing from their bedroom upstairs. Without a moment's hesitation, he said. Your children have diptheria. Bring them immediately to the San Lazaro Hospital. And with that, he left,
without even bothering to examine them. Mrs. Osmeña felt a bit slighted but her great faith in him made her follow his instructions without doubt. Again he was right the children had diptheria.

His therapy was simple. Rather than use the shotgun prescriptions of less astute colleagues, he insisted on accurate diagnosis and careful evaluation of the patient’s condition. This method saved many a patient from undergoing unnecessary surgery. Examples of this may be gleaned from the following cases:

A baby was suffering from edema of the stomach. The doctor had prescribed an operation. When my father looked him over, he immediately prescribed a simple enema—after which, the baby was cured.

A prominent society matron was scheduled for a kidney operation. A day previous to his event, she consulted Dr. Guerrero who immediately ordered the cancellation of her operations and prescribed some pills instead. Fifteen years have elapsed since that day, and she still has no need of resorting to such a drastic measure.

His extraordinary ability to diagnose enable Dr. Luis Guerrero to administer the proper treatment. Sometimes, mere advise was all he had to give, as shown in this particular case:

A baby believed to be in an advanced stage of rickets was brought to him. She had frequent crying fits and was terribly malnourished. My father looked at the baby than said: I have seen the baby let me see her mother. Everyone was astonished by his remark since they just could not understand why he seemed more interested in seeing the other when it was the baby who was sick. But, he was unmindful of comments. When the mother was brought to him, he examined her breast to confirm his suspicion; she had inverted nipples. So, during all this time, the baby had been sucking air instead of milk.

Among his numerous house calls, he included visits to the slum areas. Because of his very hectic schedule, he would shout upon passing each house: Labas and dila, labas ang mga kamay. In this manner, he singled out the sick ones.

Dedicated to Philippine Medical Education

As a class lecturer, Dr. Guerrero was dry and uninteresting. But his amazing memory astonished is students. He would repeat word for word — the contents of Castellani’s ponderous book on Tropical Medicine. At the end of the course, the student was happily surprised to discover that his lecture notes were an almost exact copy of the expressive text. Included were the scientific names of he most obscure parasites which could only be found in some remote places in Africa. His complete mastery of the subject matter enable him to quote word for word paragraphs of his notes on clinical cases, including signs, symptoms, and the cure of every diseases which they encountered in the words, knowing exactly on what pages the diseases were discussed.

Luis Elpidio Guerrero dedicated his whole career to science and in the service of the Philippine Medical Education. His various scientific meetings, congresses and convention both here and abroad. He worked extensively on beriberi and leprosy - two common scourges in the Philippines. In one of his earliest papers entitled Algunas consideraciones
sobre la etiología y el tratamiento del beriberi infantil, reference is made on the interesting work of Dr. Proceso Gabriel entitled Contribución al tratamiento del taon o beriberi infantil indicating beriberi as a principal cause of death of Filipino infants during those days. The prevalence in this country of beri-beri has since early days, made it a subject of much research, including its etiology, symptomatology and treatment.

Another important scientific paper which, together with his other works in beriberi, had won for him membership to the Royal Society of Tropical Medicine in London was his work “Protective and Curative Effects of Mongo Extract in Polyneuritis Gallinarum” this paper was done in collaboration with Isabelo Concepcion, and published in the Revista Filipina de Medicina y Farmacia in 1919. It shows that mongo extract (prepared by extraction with alcohol and concentration by distillation) fed to fowls is devoid of curative property in polyneuritis gallinarum. Its action is only preventive. His work on leprosy was recognized a decade later when he published his scientific findings on this subject. Among these are “Leprosy in the Philippines, in 1927, which includes its geographical distribution, the status of its control, and the extent of threat to public health; “Our leprosy problem and the present status of the anti-leprosy campaign in the Philippines’ was written not in a spirit of prejudice or the desire to censure anyone but with the sincere purpose of interpreting the result already obtained and to point out the defects and weak points in the struggle wages against leprosy in the Philippines. These studies were instrumental in the eventual control of the disease and the establishment of a regional leprosaria which housed the hundreds of unfortunate victims from different parts of the archipelago.

That polished rice lacks not only water soluble B but also fat soluble A vitamin was demonstrated by Dr. Guerrero in his scientific paper: “Xerophthalmia in fowls fed on polished rice and its clinical importance. Based on Isabelo Concepcion’s previous work, this was again a joint accomplishment of the two well-known medical scientists. In this experiment, they report that “tikitiki” does contain water soluble vitamin B. No mention, however, is made of the experiments as actually performed by the team.

In collaboration with Dr. Patricio Ignacio, a series of scientific studies on typhoid were conducted and the results published in the Journal of the Philippine Islands Medical Association. The first study appeared under the title of “Preliminary report on the treatment of typhoid fever by Agostinelli’s method. The report explained a technique followed by the authors as follows:

1. For the first two days, no matter what period is the disease, gypodermic injection of guaiacol and camphor, 20 centigrams each in 1 cc olive oil, is given 3 times daily: that is 6:00 or 7:00 a.m. 12:00 noon, and 6:00 or 7:00 p.m.

2. For the third day, the dose of guaiacol and camphor is increased to 30 centigrams each and is given at the same hours. Injections are given as long as here is fever and continued during the three days of convalescence following after which the original 20 centigram dose is resumed. After two days without fever, the morning injection is suspended and after two more days, the evening dose is omitted. Finally the remaining noon injection is discontinued after two more days of convalescence. No other form of treatment is employed and even hydrotherapy is entirely omitted.
Using the technique, out of 40 cases of typhoid fever; 32 (80%) recovered; 2 (5%) showed no improvement; 1 (2.5%) improved; 5 (12.5%) died.

This method was employed by Don Luis on his own twelve year old daughter. She had contracted the disease after eating bowlful of native plums (duhat).

The second article was on the “Thrombosis of the mesenteric vessels; report of a case, published in the same Journal in 1935. This study describes the causes, symptoms and report of a medical case. His last study published was “Cellular counts in the spinal fluid in epidemic encephalitis and tuberculous meningitis. In this study, Guerrero and Ignacio attempted to differentiate the two diseases by the cellular counts in the spinal fluid. In the authors’ opinion, however, this method of differentiating between these two diseases was not reliable enough and other methods in the clinic or laboratory should be employed. Pertinent data on the cases studies are presented.

Also a Writer

Dr. Guerrero in his younger days was a writer, a contemporary of such foremost Filipino authors as Cecillo apostol, Rafael Palma, Fernando Ma. Guerrero, Manuel s. Guerrero. Most of his literary works appeared in several short stories revealing his keen sense of humor and his mastery of the Spanish language. His love for the Spanish classics and literature in its varied forms revealed his rich literacy background. He was multi-lingual; his mastery of English, French, Chinese and Italian languages were fruits of his intense desire to learn. These languages were all self-taught and these proved that diligence and patience were so much a part of him.

The literary field was not to be his career for long. As a student, he finally turned to medicine only after completing in 1893 his Bachelor of Arts degree at the Ateneo de Manila.

Belonging to a well-to-do family, Luis was descendant of that line of well-known Guerrero’s, that included artists, physicians, a botanist, writers, and other prominent figures in the history of our country. The son of Brigido Guerrero and Maria Alvarez, he was born on December 1, 1874, and raised in Ermita - that suburb of genteel society south of Intramuros. During the Spanish era the Ermita district was a center of finely woven hand embroideries, as well as the home of many attractive and cultured mestiza ladies. He married the former Adela Henry, a French mestiza, with whom Dr. Guerrero had ten children.

Mrs. Guerrero was a devoted woman. During her husband’s last six months of confinement at the UST Hospital, she faithfully stayed by his side. In spite of the nurses and interns assigned to watch over him, she personally attended to her husband’s need. At 3:30 in the afternoon the day before he died, a few hours before he was to fall into a coma, Dr. Guerrero roused his wife from sleep. This was the first time in months of constant vigil, that Mrs. Guerrero allowed herself such a luxury. Still drowsy from sleep, her husband-doctor told her that he was just imagining things, that he looked so well, and that death was far from approaching. At 6:30 that same day, the “great diagnostician” was in a coma, and 24 hours after, he died.

Reading was Dr. Guerrero’s only hobby. This he indulged in every night. He read both science and he classics, and even during his bedridden days, he kept himself abreast of
the latest advances in medicine. For him, books were a source of knowledge and knowledge was wealth which could never be stolen. A riddle which he composed, is indicative of this faith:

Mayroon isang bahay:
Inakyat nanag magnanakaw;
Kinuha lahat anf laman;
Walang nawala ni ano man.

As a member of several organizations, his purpose was mainly to elevate the standard of the medical profession. In one of his speeches before the members of the Philippine Medical association, he discussed the hardships of medical practice. At the same time he appealed to his colleagues to uphold the dignity and sanctity of the medical profession and to cherish its ideals. These are all incorporated in his speech entitled “vontratiempos de la profession medica en Filipinas”.

Being one of the founders of the Colegio Medico-Farmaceutico de Filipina and the Manila Medical Society, Luis Ma. Guerrero encouraged scientific research. Other scientific organizations of which he was a member included the Clinical and Experimental Medicine, Hygiene and Preventive Medicine of the Division of Medical Sciences of the National Research Council of the Philippine Medical Association.

One of his researches, consisted of an extensive malarial survey of the Province of Rizal, investigating the blood of all cases of splenomegaly. Among the chief remedies suggested by Dr. Guerrero for he extermination of the disease were:

1. Systematic administration of quinine to all cases found carrying the malarial parasite and destruction of the larvae of anoepheles mosquitoes by sprinkling kerosene oil in all water holders and receptacles.

2. The free distribution of quinine by the government or the regulation of the sale of the drug so as to lower its retail price.

This study led eventually to the implementation of a malarial control program undertaken by the government Dr. Guerrero’s report on this subject with Victor Sevilla as co-author appears in the Philippine Journal of Science. His other published contributions include: “Treatment of Ulcus Tropicum” in collaboration with Dr. Isabelo Conception, Journal of the Philippine Islands Medical Association, 11921; “La Fiebre tifoidea en Filipinas” with Dr. Proceso Gabriel, published in the Aetas, Memorias y Communicaciones de la Cauta Asamblea Regional de Medicos y Farmaceuticos, 1918; “On the treatment of yaws with sodium-potassium tartaro bismuthate” with Dr. Ricardo Fernandez and Irene Rosal, Transaction, 5th biennial congress, Far Eastern Association of Tropical Medicine, 1917; “venom of the Philippine Cobra (Najana Jamaa Philippinees)” with Carlos Monserrat, Philippine Journal of Science, 1920; “Intoxication by Illicum religiosum Siebold”, with D. dela Paz and Alfredo Guerrero, Philippine Journal of Science, 1916. In this work, four cases of poisoning from the use of decoction of “saki”, the fruit of Illicum religiosum had been reported. Symptomatology and therapy of the poisoning are well defined.

In 1918, Dr. Luis Ma. Guerrero together with E. Domingo and Mr. V. Arguelles published his “Further observations on the treatment of yaws with Castellani’s Mixture”. Salvarsan and neosalvarsan are the specific remedies for frambesia, but their high market price and shortage, refusal of injection by patients, and lack of hospitals in the district, spurred this
team of physicians to use Castellani’s mixture as a substitute. Their results confirmed the conclusion of Castellani that the diverse manifestations of frambesia heal under the influence of his treatment and the results are as good as those obtained using salvarsan and neosalvarsan drugs.

For these distinctive scientific achievements, Dr. Guerrero was awarded several medals of honor. On July 4, 1948, President Elpidio Quirino bestowed upon him an award for his distinguished service to the country and in recognition of the impact of his achievements on the medical profession. His alma mater, the University of Santo Tomas, honored him as its most distinguished alumnus for the year 1946.

He Died of Diabetes

Luis Guerrero’s life was cut short by the strenuous demands of his medical practice. He suffered from diabetes and died in 1950 at the age of 77. Up to the time of his death, he was Dean Emeritus of the University of Santo Tomas College of Medicine.

Don Luis commanded the respect of his peers in the fields of tropical medicine, parasitology and pediatrics. He was among the first of a line of Filipino physicians that would enter the era of specialization and carve for themselves distinction in various branches of the medical profession. Through his classes he transmitted this new spirit of our country to his students. They were the richer for having shared his professional knowledge and tasted his personal charm. What many would remember him by and medical history in the Philippines would cherish him for, was his masterful blend of an accomplished diagnostican and a physician with reassuring bedside manners.

NOTES

6a. Helminthology studies wormlike parasites, especially of the intestines. Tapeworm and roundworms are helminthes.
7. Loc. Cit. p. 446-447
8. Personal Information: Mrs. Elena Guerrero Joven, daughter.
10. Ibid
11. Personal Information: Mrs. Elena Guerrero Joven, daughter.
12. Ibid
13. Ibid
15. Luis Guerrero, “Algunas consideraciones sobre la etiología y el tratamiento del beri-beri infantil”, Revista Filipina de Medicina y Farmacia, 2, no. 7 (1911) 452-464.


22. Loc. Cit., p. 446

23. Splenomegaly is a pathologic condition producing an enlargement of the spleen. This condition may be index of malarial infection.


26. Castellani’s mixture is a ......

27. Framboesia is another name for yaws. It owes its name to the characteristic raspberry like excrescences.

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3. 1912 “Etiología del beriberi”, Memorias y comunicaciones de la Primera Asamblea Regional de Medicos Y Farmaceuticos de Filipinas, v. 1: 74-129


5. 1914 “Influencia de la malaria sobre la nacionalidad y mortalidad y mortalidad total infantil en Filipinas” Revista, Filipina de Medicina y Farmacia, v. 2: 461-468.

6. 1914 Framboesia tropical y el “606”. Revista Filipina de Medicina y Farmacia, v. 2: 461-486


18. 1924 “Our leprosy problem” Journal of the Philippine Islands Medical Association, v. 4, 64-65


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GUERRERO,Luis and Isabelo concepcion, “Xerophthalmia in Fowls Fed on
Polished Rice and its Clinical Importance”, Philippine Journal
of Science, 17 1: 103, 1920.
A saving grace in the three and one-third centuries of Spanish rule in this country was the institution of a school system which gave children of the affluent class advanced education and an introduction to science and belles lettres. It was that school system, whatever its defects and short-comings might have been, that made possible the creoles Padre Jose Burgos and Padre Pelaez to see the logic and justice of Filipinization of the parishes as one of the goals of the secularization movement; for Jose Rizal; Marcelo H. del Pilar and Lopez Jaena among others to plead for reforms so that the country could advance and progress; for F. Resurreccion Hidalgo and Juan Luna to gain international recognition inspite of race prejudice; for Andres Bonifacio and Emilio Jacinto to raise the war cry for freedom; and for Anacleto del Rosario to win renown in science even in a limited way in the colony.

In fact, all the members of the Malolos Congress were products of the Spanish school system and the revolutionists in one way or another received elementary schooling it not higher education. Not the least of these less known luminaries, it can also be said, was Manuel S. Guerrero who was a product of that educational system, though he received his licentiate in medicine only in 1902. At this juncture the only thought that might be raised is how many more Rizals, del Pilars, Bonifacios, del Rosarios and Guerreros could have been produced if there were earlier freedom and enlightenment. However, in the history of civilization the people of the colonies had always been down-trodden and oppressed and the Filipino people were no exception.

In the history of the nation including our own times, it is no longer unusual that lineages or families become outstanding for contributing several children to become distinguished in diverse fields of human activity or knowledge, which in no uncertain way advances the well-being of the larger community. During the Spanish period there were very few such families, but among the few instances that might be cited was the Luna family which brought to the world several men of distinction: Manuel Luna was a violin virtuoso, Juan Luna was the painter who convinced the European world that art has no racial boundaries, and Antonio Luna was the chemist turned Revolutionist general; while there were still a doctor and a lawyer who served the nation in no small way. If number were the criterion, no even he Rizal family could be mentioned, for though Jose Rizal was exceptionally gifted. Ponciano Rizal, his brother, is the least known in Revolutionary annals. If another family lineage were to be remembered, it is the Guerrero family that should be named. The Luna and Guerrero genes bred personalities that are to be long remembered in nation building, in science and the arts. To the latter family Manuel S. Guerrero belonged.
II. The Guerrero Lineage

There is no information about the origin of the Guerrero lineage. The family was already well established in Ermita, then an independent parish, by the middle of the 19th century – Manuel S. Guerrero’s grandchildren, Leon Jorge Guerrero, having built a substantial structure for a house made of strong materials there. For it is the tradition that this commodious dwelling was one of the houses that withstood the destructive typhoon of 1879. This kind of building was a certain index that the Guerrero family belonged to the middle class. This paternal ancestor was in the employ of the Spanish government as a warehouse-keeper (Almacenero de la Administración de Rentas Estancadas) in the Pasig district from 1858 to 1868, when Queen Isabel was overthrown. He married Clara Leagordo, also belonging to a well-known family in the community, and out of this marriage two sons were born: Lorenzo and Leon. These two sons distinguished themselves in different fields: Lorenzo Guerrero in the fine arts and Leon Ma. Guerrero in science.

Of the two brothers, Lorenzo was the older. Of the fourteen children born of Leon Jorge Guerrero and Clara Leagordo, many died young of the disease called *taon* in Tagalog and cholera, the mass killers during the Spanish period. It was perhaps due to this traditional tender memory that Manuel S. Guerrero was urged in his career to devote his energy in unraveling the mystery behind the infant killer called *taon*. It is also most likely due to the diseases that plagued the country that motivated Leon Ma. Guerrero to pioneer in investigating, in a scientific manner, the medicinal properties of native plants found in the country, both during the Spanish and American regime.

Lorenzo Guerrero, the older of the two brothers, is remembered for his contributions to the development of painting both as a practitioner and art teacher.

Clemencia Ramirez, Manuel’s mother, is known to have loved books and reading and she cultivated painting, singing, and embroidery aside from her cores as a housewife. Some of her embroidery work, according to some members of her family, reached the court of King Alfonso XII of Spain. It was a big family she raised, nine children in all; however, as his was decimated by *taon* and disease, only three reached maturity. These were Manuel, Fernando, and Araceli. Fernando, the poet, is the family’s contribution to Filipino-Spanish poetry.

III. Early Years and Evaluation

Manuel S. Guerrero was born at sunrise in the morning of January 8, 1877, in Ermita, being the fifth among nine children. It was an ideal life with, and an environment that was pleasant and heathful for the house was just a couple of hundred steps to the seashore of Manila Bay. In later years the older Fernando recalled how their after would take the children to the beach swimming and bathing and playing with toy vessels. Two churches were close by, besides the dozen or so in Intramuros which was just half an hour’s walk away. According to an earlier biographer, both his paternal and maternal ancestors were well known for their piety, honesty, stainless character and personal traits. Both religious and educational facilities were, to the great advantage and convenience of Ermita residents, close by and accessible for it should be remembered that most of the rising middle class families in the provinces had to move to the metropolis first before they could avail themselves of such educational and other facilities, which was the case of the Luna family, for example.
However, his mother died while Manuel was just a little over six years old and this loss deprived the children of loving care and attention. Nonetheless, there were other understanding souls who helped raise the children to boyhood and there were his aunts Corinta Ramierz and Clarita Guerrero. The first was managing a escuela de primera enseñanza, a primary school, and it was from there that the young Manuel finished his primary education in Corinta Ramirez's Colegio de Nuestra Señora de Guia when he was but nine years old.

Manuel's older brother, Fernando, was then schooling at the Ateneo Municipal, in his segunda enseñanza, and Manuel joined him there were he received his Bachiller en Artes in March 1894 with an excellent rating. From his former teacher, later his biographer, Fr. Clotet, it is known that he was an exemplary student garnering through the years 23 prizes and medals in all, either in classroom work or competitive exercises.

It is not clear what motivated Manuel S. Guerrero to enroll in the University of Santo Tomas College of Medicine which was then located in Intramuros, the Walled City. It is known, however, that his uncle, Dr. Leon Ma. Guerrero, was already a member of the Faculty there, being a professor of descriptive botany since 1887, a position which he held until 1897. The course was mainly geared towards discovering the medicinal properties and practical uses of native plants, and so, with his uncle as a most probable guiding spirit, the young student went into medicine. There was, of course, the well known fact that Filipino babies were being decimated by all sorts of disease, the most feared and alarming of which being taon. Doctors were puzzled for generations what could be the cause of such an ailment that endangered so many young lives at this helpless stage, for sucking babies just died before ever reaching their first birthday.

**IV. A Revolutionary Interlude**

Manuel S. Guerrero was but nineteen and a half years old when the Revolucion of 1896 broke out. The Guerrero's did not participate in this first stage of the nationalist movement, though Ermita was sandwiched between Balintawak and Cavite. There was a brief interruption, therefore, of his studies in the University of Santo Tomas during the second stage of the Revolution. The Guerrero's were now awakened by the newcomers and invaders, the American forces landing just a couple of miles southeast of their home. After the American landing, in a month or so, two members of the family had already joined the Revolutionary Government in Malolos - Leon Ma. Guerrero and Fernando Ma. Guerrero. Through less impulsive, Manuel S. Guerrero also joined his older brother in the staff of La Independencia, the militant organ of nationalism and independence at any cost.

He shuttled back and forth from his Ermita home to Malolos while this was still possible until the outbreak of hostilities between the American and Filipino forces at San Juan Bridge in February 1899. He stuck to La Independencia, doing whatever he could to keep the paper from collapsing as others did. From town to town the primary was lodged in a freight car of the Manila Railroad; but as town after town fell to American forces, it was dislodged and its staff disbanded. Before this end came, Manuel S. Guerrero managed to escape and upon reaching Manila he contributed to La Patria, another militant paper edited by Pedro A. Paterno. Some members of La Independencia were able to enter Manila and they renewed efforts in putting out the weekly Manila with Jose
Palma, F. Ma. Guerrero, and Cecilio Apostol as staff members, to which M.S. Guerrero served as a contributor, using the penname M. Tralla.

When the Filipino-American war had relented somewhat in intensity, he enrolled once more in the University of Santo Tomas, where he graduated with the degree of Licenciado en Medicina y Cirujia in February 1902. After his graduation, he was appointed by the Military Government medical assistant in Emlita district, rendering service during the cholera epidemic which occurred that year. It was the worst that had hit the country during the American regime and among the casualties was the sublime paralytic Apolinario Mabini.

V. Contribution to Medical Sciences

Scientific investigation occupied his attention after his medical schooling. The cholera epidemic that year itself became the subject of a paper entitled: “Profilaxia del Colera Morbo Asiatico” (Profilaxis of the Asiatic Cholera disease) which was presented to the Colegio Medico-Farmaceutico (Medical-Pharmaceutical Association) and which received for the author a prize on June 15, 1902. In the following year, in 1903, he was appointed professor of pathology in the University of Santo Tomas. Two years after his graduation, on October 10, 1904, he read an important paper on infantile beriberi before the Colegio which earned for him admission to that learned body in the following year, 1905. True to the ethics of science, Dr. M.S. Guerrero acknowledged his indebtedness to the observations made by Dr. Luis R. Guerrero and Dr. Quintos. It appears, however, that this work never got published an unfortunate event, for it would have established his priority in infantile beriberi studies. Even without such documentation, Dr. Guerrero’s contemporaries later on acknowledged the significance of his experimental findings.

Together with other doctors, Dr. Guerrero never ceased in his deep concern to ameliorate the scourge that was plaguing Filipino infants and haunting thousands of mothers. In the year he read his initial paper on infantile beriberi it was reported the infant death rate for the City of Manila alone in 1904 was 811.5 deaths per 1,000 births. Infant mortality, therefore, became one of the national concerns; it was the motivating force that moved the founding of a private institution cleared La Gota de leche “to furnish pure sterilized milk to infants whose mothers were unable to nurse them”. The enterprise was later incorporated and became known as La Proteccion de la Infancia. In its technical staff Dr. Guerrero served for many years together with Dr. Fernando G. Calderon, Dr. Gervacio Ocampo and Dr. Joaquin Quintos who were then gaining reputation in their own fields of specialization.

In 1910 the Colegio Medico-Farmaceutico began publishing a scientific journal called Revista Filipina de Medicina y Farmacia in whose staff Dr. Guerrero and Dr. Quintos presented a joint paper entitled: el Beriberi en los Ninos de Pecho (Observaciones Anatomico-clinicians)”, (Infantile Beriberi: Antomical-Clinical Observations) in which the authors underscored gravity of the problem of infant mortality.

The two authors traced the history of studies on taon during the Spanish period initiated by Dr. Manuel Xerez Burgos (1889) and later by Dr. Manuel Gomez Martinez, the Japanese Professor Hirota, up and until the first decade of the 20th century when studies by Dr. Guerrero himself and that of Dr. Jose Albert (1908) were undertaken. The two
medical scientists came up with an identification of taon as “a form of beriberi transmitted to a child by a mother or wet nurse sick with beriberi by means of her milk in almost all instances, rarely in the uterus.

Dr. Guerrero and Dr. Quintos were not certain of their findings themselves. It was however, Dr. Guerrero who continued his experiments; he carried laboratory studies on the effect of milk of beriberi mothers on the heart of frogs (1911, 1912). Later Dr. Daniel de la Paz pointed out the significance of Dr. Guerrero’s work:

….Manuel S. Guerrero studied the action of beriberi milk on frog’s heart. He was the first to employ pharmacological methods in the elucidation of clinical phenomena in the Philippines. He excelled his local contemporaries in clinical medicine on resourcefulness.”

His initial studies were received with accepriism at first, but these proved to be the beginning of a series of investigations which culminated in the identification of the causes of infantile beriberi. He continued his work until his death.

To appreciate the significance of Dr. Guerrero’s contribution to medical science, it should be noted that during the Spanish period until the first two decades of the American regime, “Every other child died before his birthday” and “the Philippines had the uneviable distinction of having the highest mortality rate in the world” in the words of Dr. Victor Heiser.

Dr. Guerrero knew how to focus his attention on a problem: work after another was concentrated on infantile beriberi. Dr. Jose Albert, who was in one way or another a specialist on the subject, later on assessed the value of Dr. Guerrero’s contribution to medical science as follows:

Guerrero’s article accomplished four important things - first, it established the first basic symptomatic link; second it produced a complete revolution of our ideas concerning “taon”; third, it paved the way for a new orientation in the study of this malady; and lastly, it renewed our interest in the mystery of this disease..

As early as 1904 Guerrero’s contribution to medical science won recognition with a silver medal award in the Louisiana Purchase Exposition; and very much later, in the Panama-Pacific International Exposition in San Francisco, 111915. Dr. Fernando Claderon, a competent authority, thought highly of Guerrero as the true father of studies on infantile beriberi in the Philippines. Dr. Jose E. Montes, another contemporary authority, would qualify Dr. Guerrero for the Nobel Prize in science as a true benefactor of humanity.

Santos Cristobal grouped his writings into: (1) articles or sketches describing customs; 2) folktales, and 3) scientific articles. Most of the first two types are well represented in a posthumous work entitled: “Prosa Literaria (1921) and the third group is listed at the end of this sketch. Don Panyong as E. delos Santos Cristobal was known to his circle of friends and admires went on to evaluated the quality of his literary works by comparing them with those of Guerreros’ predessesor of the Propaganda Movement as follows:

Dr. Guerrero’s productions are almost with out precedent in the Philippines Islands, if we except some of the articles of Gen. Luna and Lopez Jaena and the incidents in Rizal’s novels. But, although these “forerunners of the Revolution” wrote outside if the
Archipelago, yet as regards scope, quantity and quality, and especially, fluency of language, both in the tongue of the noble birthplace of the Castilian language as well as in the dialect derived from it, the Emita patios, so picturesque and graceful, they were not his superiors, but speaking of literature, the two authors first named are inferior to him so far as artistic execution is concerned.

Aside from literature, his other interests touched on Music and painting; he had some aquarelles.

VI. Other Services and Family Life.

In social and professional work Guerrero was also active and showed much interest. He was the secretary of the committee of the Colegio Medico-Farmaceutico designated on September 2, 1911, to organize a society for the protection of infants and which was largely responsible for the publication of the Boletín. He was secretary of the first 1912 and the second (1914) Asamblea de Medicos y Farmaceuticos de Filipinas, which were instrumental in the passage of Act 2376 February 28, 1914 and the chairman of the pediatrics section of the third (1916) Asamblea. He was a member of the Council of Hygiene and one of the founders of the Liga Nacional Filipina para la Proteccion dela Infancia and its subsidiary La Gota de Leche.

He was married to Elisa Ocampo (June 25, 1883-April 19, 1958), daughter of Martin Ocampo, the publisher of El Rencimiento and El Renacimiento Filipino, exponents of Filipino Nationalism and culture, and Trinidad Barred, on February 18, 1905 by whom he had eight children: Clemencia +; Renato M. Josefina Veluya (da Cynthia M. Manuel Madrigal); Edmundo, playweight and drama director, unmarried: Lorenzo Jesuit priest; Manuel M. Regina Santos (children: Benjamin, Jose); Imelda (d. 1942); and Benjamin (d. 1945).

He died of cancer a few days before reaching his 42nd year.

--E. Arsenio Manuel

NOTES
2. Ibid., p.8
3. This work was published in the same year (see “Scientific Contributions” appended at the end of the sketch).
4. See M. S. Guerrero and Joaquin Quintos: El Beriberi en los Ninos de Pecho (1910), II
8. Summarize from the introduction of above work. Ibid., p. 3.
9. Ibid., p. 3
10. See the works in Scientific Contributions at the end of sketch.
13. Studies on five Hundred Cases of Infantile Beriberi (1935), p. 3.
see his “Manuel S. Guerrero como Scientifico,” in El Dr. Manuel S. Guerrero y la Prensa (1919), p. 70.

See his “Manuel S. Guerrero como Membro del Colegio Medico-Farmaceutico de Filipinas,” in el Dr. Manuel S. Guerrero’s Prosa Literaria (1921), p. 11.

Epifanio de los Santos Cristobal: “Prologo” to M. s. Guerrero’s Prosa Literaria (1921) p. 11.

Ibid., III.

In his “Manuel S. Guerrero, Literature and Journalist,” Philippine review, v. 6, nos. 10-12 (October-December, 1921), p. 563.

SCIENTIFIC CONTRIBUTIONS


2. 1910 Anatomia Patologica del Beriberi de los Ninos de Pecho,“ Revista Filipinaa de Medicina y Farmacia, (RFMF) 1 July 1910) 1-7.


5. 1912 “Accion dela Leche de Madres Beribericas sobre el Corazon dela Rama, su Valor Diagnostico en el Beriberi Infantile,” RFMF III (1912) 319-33. In collaboration with Dr. J. G. Gavieres. Also in Memorias y Comunicaciones dela Priemra Asamblea Regional de Medicos y Farmaceuticos de Filipinas (Manila: 1912); also transl. in Manila Medical Society Bulletin, IV (1912), 167-177.


7. 1913 Proteccion de la Infancia”, RFMF IV (1913), 131-1-3, 719-722.


14. 1917 Diagnostico del Beriberi Infantil,” RFMF, VIII (April 11917) Also in cultura Social, April 1917.


POSTHUMOUS WORK


“Prologo,” by Epifanio de los Santos Cristobal. A number of the articles and folktales must have been reproduced later (see Los Moscardones”, El Debate, Domingo, XV> no 182, April. 1, 11934, p. 3,7.
Alfredo S. Velogo translated seven of the folktales into English and these appeared serially in The Manila Chronicle under the heading “Philippine Folklore”, starting from Sept. 2, 1957.

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Rafael Palma, Manuel S. Guerrero como Cuidadano.
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II. Personal information furnished by:
Elisa de Guerrero before World War II, and corrections and additions furnished by the same informant, Manila, March 3, 1936.
At the time she was born, Rizal had just exposed in Noli Me Tangere the colonial “social cancer” which, in the end, would find its cure not in the peaceful Propaganda of the ilustrados but in the separatist Revolution of the masses in 1896. At her death eighty-two years later, what was considered by activist students as the Second Propaganda Movement had so exacerbated the creeping crisis of the civil order inherited with Independence that another radical therapy event then became an urgent national necessity.

Dr. Honoria Acosta Sison, therefore, spent her active life in what may aptly be called times of “national ambiguity”. She belonged to that generation of Filipinos whose contributions were made when the nation was in an uncertain but creative respite between two periods of historical crisis.

The scientist, in particular, helped immensely in rendering the nation viable in this period of our history. In this endeavor, those in the medical profession probably had the most concrete results to show. Plagued for centuries with endemic and epidemic diseases, the Philippines witness within the century a sharp decline in mortality from more than 40 deaths per thousand persons around 1900 to less than twenty in 1970. In conjunction with the undiminished birth rate, this brought about the phenomenal increase in the population of the country. While constituting in our times pressing problems in terms of economic developments, this growth in population seems to underline nonetheless our viability as a nation. More than this, it gives the measure of what the medical profession has been able to accomplish within the last three generations.

This released of the Filipino people’s vitality through better institution as well as professional health and hygienic care went hand in hand with the constant progression in the number of physicians in absolute and relative terms. After having dropped from 587 for the period 1901-1905 to only 291 for 1906-1910 and even 252 for 1911-1915, the number of registered physicians increased steadily from 370 for the period of 1916-1920 to 446 for 1921-1925, 638 for 1926-1930, 1212 for 1931-1935, reaching a peak just before the war with 1775 for 1936-1940; decreasing for 1941-1945 and 1946-1950 with only 1132 and 1057 respectively before again picking with 2,861 (more than the previous ten years) for 1951-1955 and 5,067 for 1956-1960. Relative to the population, the number of physicians also increased considerably, though the 1970 ratio of 1 physician to 1,400 persons is indeed still inadequate. Despite the increase in population, this ratio improved from approximately 1:13,000 in 1905 (1903) to 1:7,630 in 1920 (1918), 1:3,190 in 1940 (1934), 1:2,600 in 1950 (1948) and 1:1,500 in 1960. The entire development would mean to show not only the continuing impact of the modern world and medicine on the Filipinos (though confined mainly to the urban areas in the early years) but more so the degree of responsibility carried by the medical profession for the health of the nation in its formative stages of growth.

The responsibility was all the heavier for the fact that, aside from the “ordinary” business of healing, it likewise became the task of the incipient medical profession at once to increase its number through the training of new physicians and to improve or extend existing knowledge of diseases and healing techniques through scientific inquiry.
Among those who not only but also taught and inquire further into the art of healing was Dr. Honoria Acosta-Sison. A pioneer in Philippine obstetrics and gynecology, this first Filipina medical doctor was equally a scientist and a teacher. As a scientist, she was undoubtedly the most productive if not the most original of her generation. As Professor in the U.P. College of Medicine, she helped train several generations of physicians. But she was a teacher, above all, because her life and calling were but the mirror of her values, an illustration of her inner convictions. Any attempt to understand her contributions to the Philippine science and medicine should look into this aspect of her personality. In this biographical sketch, therefore, Dr. Acosta-Sison's outlook in life shall also be considered following a survey of her life and career and a more detailed analysis of her scientific contributions.

Life and Career

Viewed from the flux of individual days and inevitably coming and passing to pile up towards that anticlimax which is death, no human life seems to constitute a unity. To the individual consciousness, every day, week or any longer segment of time brings nothing but chance or a range of possibilities. It can reasonably be supposed that this was how Dr. Honoria Acosta-Sison “went through” the successive instants which, in the end, added up to shape the jewel that was her life. Through each of this moments, she was of course “creating” her life, tracing the lineaments of what would become its completed form. Precisely, however, because she was building it from within, the total view of her life was not here to behold.

The total view of any life is possible only when it is complete — that is, after death. But then only its external form is perceptible, its essence being the inaccessible secret of the dead. Viewed therefore from its span of eighty-two years, the life of Dr. Acosta-Sison becomes an integral whole. As a continuous creative endeavor, it divides itself naturally into four periods. The first twenty-one years from her birth up to her return from the United States after completing her medical studies constitute a sort of prelude, the solid foundation to her life work. From 1910 to 1988, she was occupied with building a home and family, while practicing obstetrics and gynecology (which she helped found as a specialized field in the Philippines), improving surgical and other medical techniques, teaching at the U.P. College of Medicine, and writing scientific papers for local and foreign journals. From 1939 until her retirement from the U.P. College of Medicine in 1955, she was at the pinnacle of success, gaining unquestioned national and international recognition as a scientist, a physician and a teacher. Her last fifteen years were no less active than her youth, being filled with speaking engagements at seminars and conferences and with the incessant writing and publication of quality scientific papers in quantities she had not therefore reached.

Why she decided to become a doctor is a matter of conjecture. In 1933, nearly thirty years after the fateful decision, an article featuring her as the “first Filipina physician” affirmed that it was because “early in life” the young Honoria “was stuck with (sic) the appallingly large number of women who died when going through childbirth” and discovered that this was due to “the standard of morality of those days” which prevented the women from “summoning a male doctor to assist them during the pangs of travail.” While it is indeed not impossible that much revelation should dawn upon the fifteen-year-old girl that Honoria then was, there is no contemporary evidence that they
indeed push her to take up medicine. The only autobiographical sketch that Dr. Acosta-Sison attempted ends abruptly with her departure for the United States and gives no hint whatsoever as to her motivation. Nevertheless, in 1958, she was believed to have “vowed to be a doctor because she was moved by the pathetic plight of pregnant Filipino mothers” who “were succumbing to post-delivery complications aggravated, if not induced by...” Hilots and losing their babies on account of ignorance and neglect regarding pre-natal care.” Hilots, post-delivery complications, and pre-natal care became indeed important areas of research for Dr. Acosta-Sison.

The more likely reasons should perhaps be sought in young Honoria’s personality and in the specific circumstances of her times. The generation responsible for the Propaganda had ushered in an epoch of great achievements among Filipinos. With the dislocation of the Malolos Republic, their energies were diverted to creative activity. Thus, a vast resurgence in the vernacular tongues (particularly Tagalog, the language of revolutionary resistance against Spain and America) took place in conjunction with the renascence of the Arts. In other fields, Filipino potentials were likewise awakened. In this, the women were no less involved than the men. The more enterprising ones founded schools like the Instituto de Mujeres (Florentina Arellano, Rosa Sevilla and Susan Sevilla) or the Centro Escolar (Liberada Avelino and Carmen de Luna), while the others began to seek higher education and entry into the professional schools, which had been denied them during the Spanish regime. Aside from this élan of the nation in general and of the “weaker” sex in particular, one must also consider the opportunities offered by the tortured conscience, of an American democracy freshly converted to missionary colonialism. Priority in the training and scholarship programs was then given to skills which like medicine and engineering, were needed to help extricate the new protectorate from its perceived Asian backwardness and infirmities.

In any case, Honoria’s decision was in keeping with the independent and enterprising beat of her personality. She was not averse to try what was new and challenging. During the Spanish regime, the highest educational attainment women could aspire for had been “graduation from the Superior Normal School for Women Teachers.” In 1901, therefore, when the new American government established a Normal School in Dagupan, she enrolled and, as she herself wrote, “that was my first contact with American teachers.” Earlier, despite the nationalist commitment of her immediate family, she had been impressed by the good behavior of the American soldiers who entered Dagupan “not by shooting but simply threw (sic) many ten cents pieces of silver money before the townspeople,” in contrast to the Katipuneros who were welcome as “kapatids” but “went up to our homes to rub us the heirloom gold and silver coins and jewelry my father treasured and clothing” (sic) and even “began to put on their feet the many pairs of shoes of my grandfather” who “scolded them roundly calling them thieves.”

Consequently, she must have been a most eager pupil. When a call for volunteer teachers was made to handle the primary grades, the young girl of twelve raised her hand to the surprise of everyone, for she “had been studying English for only one month.” She was of course accepted. Later, in 1904, she had to cajole her father into signing her application to take the examination to take the examination for “pensionados”. This was another challenge, in the same manner that becoming a physician was going to be, since, as her friends pictured it, any man “would feign illness just to get her alone with a room with him.” There was surfacing from within her that spirit of enterprise and independence common in the pre-Hispanic Filipina, and conserved by them to this day.
For she came from a well-to-do-family. Her most cherished memory of her father was “of a man clothed in white suit with a black top hat” returning from “trips to Calasiao and Manila.” Don Macario Acosta y Sison owned some property in Dagupan, Pangasinan and was the captain of the boat operating between Manila and Pangasinan. Doubtless, this was one of the sailboats owned by the family of her mother, Pastora Dizon. At any rate, Dr. Acosta-Sison wrote that these “traveled regularly the coast towns of Luzon and even to Manila.” Honoria considered her father an “old-fashioned gentleman” who had “deep-seated in his breast a big heart that knew and understood her will” and whom she loved very much as a child.

Doña Sison was from Calasiao, Pangasinan, where Honoria herself was born on December 30, 1887. Honoria never knew her mother, for she died two years after she was born. She knew her to have come from “what then was considered as an affluent family” and remembered “the framed pictures of three sailboats named after my mother, Pastora and two of her sisters.” Pastora was fond of beautiful dresses which “were sewn inside a big mosquito net to prevent them from being soiled.” After her death, her husband reverently conserved in a big narra aparador “with crystal knobs showing flowers within” all her “gorgeous sayas and thickly embroidered piña camisas and pañuelos.

The young orphan was taken by her father to live in Dagupan with her paternal grandparents. She was shy and “liked only certain people,” avoiding strangers and not being able to make friends easily. Late in life, she would still remember “the little black dresses made for me in mourning for my mother.” But she evidently had a fixation on her father; she always longed for his company and admired him for the fact that his mind “was steeped in the sacred memory of my mother and the future of his two living children.” In her short autobiography, this is the only mention of “the other living child,” whose sex is not even specified, although there is fond recollection of her grandmother with her courtyard “filled with fruit trees and vegetables” and of the grandfather whom she pampered and who “was an old man with a long white beard” continually occupied at reading books in Latin, remnants of his seminary days, before he met the grandmother. Does forgetfulness mean she did not have a childhood with children, but one mainly with adults? Or was it because hers was a self-restrained nature? But her very special relation with her father she could and did not repress.

Be that as it may, her childhood must have been sheltered, in the company of her grandparents and aunts. The family was religious in the traditional way, gathering for the angelus and praying the rosary every night, with the 19th of every month being dedicated to “special prayers for St. Joseph.” What would remain in her memory through the years was the “beautiful face of the Blessed Virgin surrounded by the crown of gold” and the lesson in the chant to her; “Bendita sea tu pureza y eternamente lo sea,” blessed be your purity and let it be so eternally.

It was in Spanish that she held her first schooling, as her first prayers and holy chants already were. When she entered the Santisimo Rosario convent, she could already read and even recite from memory, “the whole “Doctrina Christiana” taught to children,” aside from Our Father, Hail Mary and the rosary in Spanish. She stayed three years there, taking up reading, writing and arithmetic, aside from learning “how to sew, crochet and to embroider and the rudiments of Spanish grammar and history.” She was, in other words, on her way to becoming the typical semi-educated woman of the Filipino principia of late Spanish times.
The Americans came however, and she became a teacher; but it was a maestra who was at the same time learning to speak English, preparatory to absorbing the new industrial culture from the Protestant West, while receiving the magnificent salary of 17.00 a month, soon raised to 26.00, “the highest I ever receive before going to the United States in August 15, 1904.” America had beckoned. She would respond to the challenge.

She belonged to the second batch of pensionados, the first one, numbering a hundred, having been sent to the United States in 1903. This time, ten had been selected out of a total of 357 candidates. Two were women, Honoria and her future sister-in-law, Luisa Sison. The young Honoria chose to study medicine, apparently against the advise of her father and the entire family, probably to follow her childhood sweetheart, Antonio G. Sison, who had gone to America the preceding year as pensionado. It was to Philadelphia that she was sent, where women could then study medicine in the Women’s Medical College of Pennsylvania. In order to complete a high school education, she enrolled in the Drexel Institute and later the Brown Preparatory School. In the summer of 1906, she took up English at Cornell. In December of the same year, the Filipino Students Magazine reported that Honoria Acosta and Olivia Salamanca had finished their preparatory courses and were then in their first year in the Women’s Medical College. Salamanca was her competitor for the title of “first Filipina doctor,” but Honoria would finish earlier.

She obtained high ratings in her subjects, getting the anatomy prize in 1908. In the previous year, she had also become the editor-in-chief of the Philippine Review, the former Filipino Students Magazine, the official organ of the Filipino students, which had been founded in 1905 to defend “the interest and aspirations of the Filipino people in America.” In 1909, she graduated from medical college, “the first woman of her nationality to become a physician.” Because of her good scholastic record, she was given a chance to specialize in obstetrics for another year as a resident in the Maternity Hospital of her alma mater. In February 7, 1910, she returned to the Philippines.

Her father died while she was in the United States. There could be no question of coming back for the burial not only because of the distance involve but likewise because her studies had to be completed in a prescribe period of four years. However, she was later able to stay another year of specialization. She went back to the Philippines and could well have indulged in “the pleasant thought” that if her father was alive, he would have been there at her arrival and “among the first to congratulate his daughter on being the first of her kind in the Philippines to become a doctor of medicine.” But lying perhaps much deeper in her mind was “the big mission [she had] to perform — a mission that would redound to the benefit of her sex and of the country in general.”

She immediately became a full-time assistant in obstetrics (with a salary of 1,500 per annum, she did not forget to record in her curriculum vitae!) at Saint Paul's Hospital, which had only recently been established, together with the Civil Hospital and the Mary Johnston Hospital, to add to the San Juan de Dios Hospital, “the oldest in the Philippines.” The Government had then also already started a medical school with teaching clinics in surgery, obstetrics and pediatrics at Saint Paul’s. The school was later to become the College of Medicine and Surgery, the first unit of the present University of the Philippines, where she would enter as Instructor in obstetrics in July 1912.

Obstetrics cases were then generally delivered at home under the care of hilots, who had no instruction whatsoever in asepsis. In all the four hospitals in Manila, there were
only 32 Filipinos born from July 1, 1908 to June 30, 1909, whereas in the Philippine Medical School, for the period from June 1, 1907 until March 31, 1910, just a month before Dr. Acosta-Sison started to work there, only seven deliveries per month took place “with a maternal mortality of 12% and fetal mortality of 35%.” Most of the cases had been abandoned by the hilots and the traditional midwives or comadronas.

It was evident that a campaign had to be launched to wean the Filipinas away from the hilots “whose main claim in their trade was that they had delivered so many cases.” They were ashamed to be seen by men and “would often rather than die than be attended by them.” Dra. Acosta-Sison joined the other doctors to attract “our poor parturients to the hospital.” They literally had to go around in calesas and stop pregnant women in the streets in order to invite them to see the staff of Saint Paul’s and later the Philippine General Hospital. Dr. Fernando Calderon, the Chief of Pediatrics then, “used also to give Tagalog lecture to gatherings of women in poor districts.” It was indeed a quasi-seminary effort which in the end be rewarded, “so that a few years afterwards instead of going out of our way to make patients enter the hospital, we had to discharge them earlier than usual to accommodate new applicants.”

The earliest articles of the pioneer Filipino doctors then, including Dra. Acosta-Sison were on prenatal and postnatal care, as well as such complications as rupture of the uterus, infections connected with childbirth and placenta previa or childbirth with the afterbirth coming out first. Child care was still a matter of tradition. Uterine rupture was oftentimes caused by the hilots technique of the salag or “the forceful pushing downward of the fundus done preferably by two persons, one on each side.” Babies often died of tetanus and the mothers of childbirth complications. The hilots sometimes practiced the sara, which consisted of “making squat over hot embers a few days after delivery,” so that “severe burns of the vulva and buttocks” resulted.

Of the three articles on obstetrics written by Filipino physicians in 1910, Dra. Acosta-Sison wrote one, the first in the English language, the other two being in Spanish by the much older Dr. Calderon. It dealt on the care of the parturient woman before and after childbirth. She had seen how many Filipinas “were succumbing to post-delivery complications... [and] losing their babies on account of ignorance and neglecting prenatal care,” as G. Garchitorena-Goloy would later write concerning Dr. Acosta-Sison’s choice of the medical profession as a vocation. In May, 1911 she read before the Manila Medical Society a paper on the incidence of placenta previa in Manila, with a report of twenty-two cases, later published in the Bulletin of the same society.

In the meantime, she had, “united her faith,” with that of Dr. Antonio G. Sison who had entered St. Paul’s earlier as resident in Medicine. Dr. Sison was also from Pangasinan, where there are many Sisons... who are not related in any way.” He had studied in San Alberto-Magno, a school which used to be operated by the Dominican fathers some twelve to fourteen kilometers from Lingayen, before taking his college degree at the Liceo de Manila, which he represented at the competitive examinations for membership in the first batch of Filipino pensionados to the United States. They had known each other “since their childhood days” and there in the foreign and, they had doubtless promised to get married when both came back to the Philippines. The marriage took place on November 26, 1910 in Lourdes Church in Intramuros very early in the morning, for they were to go to Pangasinan afterwards. Only a few persons were present with the famous Dr. Baldomero Roxas, then Associate in Obstetrics as one of the sponsors.
The young couple would not have children immediately, but they were soon able to build a house in 1913, not far from the Philippine General Hospital which had been organized in 1911 and where both of them working. Previous to that they were renting a house in Ermita, near the U.P. College of Medicine. The new house was in the countryside at the time, an area surrounded by talahib; Dr. Sison Jr. recalls that Taft Avenue was opened only in the late thirties. To reach La Salle from their house, he had to take in his adolescent years, the old San Andres-Leon Guinoo route.

Dra. Acosta-Sison was extending her scientific horizons. In 1912, the year she was appointed Instructor in Obstetrics at the U.P. College of Medicine, she developed a curious interest in elephantiasis, publishing an article on a congenital form of this affliction in the Bulletin of the Manila Medical Society. She also inquired into the obstetrical practices of the Igorots in 1913, one of the first investigations by a Filipino in what would later be called medical anthropology. In 1914, she attracted great attention in the regional assembly of Doctors and Pharmacists in the Philippines, with a paper on the pelvic and head measurements of Filipinos. The first of its kind in anthropology and medicine written by a Filipino, it responded to a need for more data on Filipina parturients and babies, a realization that American materials might not after all be utilizable in the Philippines.

Then, for four years from 1915 to 1918, she did not produce any scholarly work, as if in condolence with Europe and the World at war; but during this period she showed a sudden interest for German, going through the whole process of certification at the U.P., in order to enroll in this language at the College of Liberal Arts for the school year 1915-1916. Germany was then not only at war with most of Europe but was also making an immense impact on world science. Dra. Acosta-Sison was not going to allow herself to be left behind.

In 1918, even as the First World War was grinding to a halt, Dra. Acosta-Sison went with her husband on an observation trip to the United States, staying to work for a while at John Hopkins Hospital with Dr. Williams. Upon their return in the Philippines, the couple would start agitating for the creation of a new department of gynecology separate from those of surgery and obstetrics at the U.P. College of Medicine. Dean Calderon, Dra. Acosta-Sison’s former chief in Obstetrics, “appointed himself as the Chief of the [new] Department,” with its staff being taken from both surgery and obstetrics. Only Calderon and Dra. Acosta-Sison came from the latter department, the others originating from surgery. The new department was inaugurated in the school year 1922-1923, with six courses opened. It was only from the school year 1925-1926 however, that Dra. Acosta-Sison was given a course, the Gynecological Dispensary, which she shared with Dr. Aniceto Mandanas.

The Sison couple also brought back to the Philippines something just as new as gynecology, although rather more obstetrical in nature. When Dra. Acosta-Sison reported for duty on January 21, 1919, to the Department of Obstetrics, she was expecting her first baby. It was born on May 1, 1919 and baptized Antonio, after the father. As he was later to speculate, his mother had probably prayed for a child to Our Lady of Perpetual Help in Boston, the couple’s patron saint. Two other children would follow Antonio Jr. at regular intervals. Honoria was born on January 22, 1921, while the third one, Pastora, named after her grandmother, came on November 28, 1923. Probably by design, Dra. Sison did not have other children thereafter. She could now concentrate more fully on her work as doctor and scientist.
Even while she was having her babies, she not only continued to serve as head of the parturient clinic at the P.G.H. and as assistant professor at the U.P., but likewise published scientific papers, seven of them from 1919 to 1923, even as she wrote in 1922 the first book by a Filipino physician on pre-natal care. The articles dealt principally with pregnancy and childbirth particularly the causes of premature labor, uterine rupture and the manual extraction of the placenta. She had continued her research on the pelvic measurements of Filipinas in relation to the hand-size of new-born Filipinos, publishing her result in 1919 in the Philippine Journal of Science. It came as no surprise, therefore, that she was promoted to the ranks of Associate Professor of Obstetrics in 1924, while becoming a member of the new department of gynecology at the University of the Philippines.

As associate professor of obstetrics, the lady doctor did not confine her scientific interest in her specialization. She of course kept on her old line of research, analyzing a case of complete inversion of the uterus in 1924, another of umbilical hemorrhage accompanied by deep jaundice in 1925, and maternal mortality among Filipinas in 1926. But she also got interested in the tuberculosis in its relation to childbirth even as she wrote popular articles in the Bulletin of the San Juan de Dios Hospital on what a Filipino wife or prospective mother should know (1927) or on the utter needlessness of the so-called "perils" of motherhood (1928). She became an inventor of obstetrical instruments. In 1927, she wrote in the American Journal of Obstetrics and Gynecology about her new sagittal pelvimeter and its importance in the management of parturient labor and also presented the newly invented obstetrical forceps to facilitate the delivery of the fetal head.

For nine months in the same year, she went on an observation trip to Europe, visiting hospitals in Berlin, Dresden, Vienna, Paris, London and Dublin, where she saw the popularity of laparotrachelotomy or the surgical section of the abdominal wall for diagnosis or further surgery, in lieu of the classical cesarian section. Upon her return, she perform such an operation, the first one in the Philippines, in February 1928 upon a patient with severe eclampsia (a toxemia of pregnancy) and a closed cervix, in an attempt to save the child. The child was saved, although the mother died of toxemia. This encouraged her to perform further operations which were more completely successful. In August of the same year, at the age of forty, she became Acting Head of the Department of Obstetrics, being also appointed Lecturer in Prenatal Care at the School of Public Health Nursing in 1929. She had by then published something like twenty-seven scientific and popular articles in her special field. She had just started.

From 1930 to 1938 inclusive, she wrote forty papers and a book, Obstetrics for Nurses (1936), averaging more than three contributions per year and constituting more than one-half of the seventy (70) publications on obstetrics and gynecology for the period. She was continuing her old research directions, while doing some popular articles for the benefit of women and young people. She had also begun to be interested in nutrition in relation to the parturient and the newly-born and older babies, and more importantly, in chorioepithelioma or choriocarcinoma, malignant tumor arising spontaneously in the ovary following pregnancy, which was to become a special subject of research for after she wrote the first article in the Philippines in its clinical forms in 1937. Earlier, in 1934, she had presented to the medical world a simplified technique of the podalicversion a manual operation of turning the fetus feet in the uterus to aid in delivery.

The thirties had indeed carried her to a very high plane of scientific competence. It was also then that she began to write “unexcelled literary essays” in national magazines and
newspapers. In 1933, she was seen as a woman never too busy to have wholesome recreation with her three children and to engage in social and literary work. Her writings “on life, health, happiness, children, the home, in fact in subjects that are not wholly interrelated with medicine” pictured her to be “a woman with broad outlook and a fine civic spirit.” Aside from this, she had also gone back to college, enrolling at the U.P. from the summer of 1930 up to the end of the first semester, 1936-37. She took up Philosophy, where she had relatively good grades, and Psychology, where her grades were all excellent. She was particularly interested in oriental philosophy, systematic psychology, the psychology of adolescence and experimental psychology related to work and fatigue.

Towards the later thirties, she was the mother of three adolescents and she was at the peak of a career which entailed a great amount of dedicated work. Her trip in 1934 to the United States to accompany her husband who had become the personal physician of the then Senate President Quezon, was a welcome respite. In 1935, while continuing as physician at the Philippine General Hospital and as Associate Professor of Obstetrics at the U.P., she became a Class A Lecturer on Maternal Hygiene at the Postgraduate School of Public Health. In 1937, she was also appointed Associate Professor of Gynecology, thus adding to her normal load at the U.P. College of Medicine the task of handling lectures and conferences in gynecological subjects. By October 1938, she was part-time Professor of Obstetrics, with a salary of 2,500 per annum. It was also in the same year, the thirtieth anniversary of the founding of the University of the Philippines, that she was chosen as delegate to represent the Philippines in recognition of her almost three decades of teaching.

The year 1939 began a new phase in her career, that recognition here and abroad, even as she engaged in more intensive and creative research activity. With her colleagues, she organizes then the Philippine College of Surgeons. On recommendation of the Board of National Research Council, she went in September as the Philippine Commonwealth Delegate to the First American Congress in Obstetrics and Gynecology at Cleveland Ohio, where she presented a paper on the pathologic lesions in eclampsia, a malady with convulsions resembling epilepsy resulting from some actual disturbances of the nervous centers caused by anatomical lesion. She stayed on to be the Philippines member at the 29th Clinical Congress of Surgeons in Philadelphia held on October 16-20, 1939. The war which broke out in Europe prevented her from returning by way of this continent which had continued to fascinate her since her sojourn there a dozen years before.

War was also threatening in the Pacific when she came back, but her work and research continued. In 1940, she came out with five papers, including the one she delivered at the Congress in Cleveland and another concerning her observations there and at the Clinical Congress of Surgeons. The latter was later summarized in her report to the National Research Council of the Philippines. Aside from the more scientific observations, Dra. Acosta-Sison ventured the opinion that:

"By and large, modesty aside, the Filipino physicians and the hospitals in the Philippines, taking into consideration the size of the country and the state of our financial resources, can hold their own and be proud of their achievements... Filipino physicians possess as good judgment and as much ability, skill and power of growth, and as high a sense of responsibility as any physicians elsewhere. The difference
lies only in the wealth of material resources which enables the scientist abroad to work in modernly equipped laboratories and clinics, with adequate personnel and thus to utilize and enlist in his aid all the modern instruments and devices that science has produced."

She was then honoring the individual, hardworking men and women of her profession, while underlining the inadequateness of their socio-economic milieu. It was at the same time a tribute to the resourcefulness and the immense possibilities of her people.

While two other papers dealt on extrauterine and abdominal pregnancy, one reported on an attempt to reproduce the organic lesions of eclampsia, the disease which had begun to preoccupy her even before the Cleveland congress. In the same year of 1940, at the age of fifty-two, she received her first honorary doctorate in science, fittingly from the Philippine Women’s University. The following year she was elected vice-president of the Philippine Medical Association, whose Council likewise appointed her Associate Editor of the Association’s journal. She also became acting head of the Department of Obstetrics in the U.P. College of Medicine, whose Mu Sigma Phi Fraternity and Sorority awarded her with an oil portrait together with a write-up recognition of her efficient service to the institution.

About this time the war came to her native land, with a new imperial power seeking to do the Filipinos good. Of this war which brought “the four horses of Apocalypse across the fair face of our land,” she was later to say that it “brought us far greater damage than destruction of houses, the onslaught of famine and disease, and the loss of countless lives; it snatched from our hold our moral mooring. Dra. Acosta-Sison was indeed affected by the profound dislocation that it engendered. For, while she had still published three papers in 1941, she could only present a paper on her favorite subject of chorioepithelioma at a seminar of her college in 1942. During the entire Japanese Occupation, no work of hers saw print. She nonetheless continued to work, even becoming Professor and Head of the Department of Obstetrics both at the U.P College of Medicine and at the Philippine General Hospital and, the Professor of Gynecology. Her curious spirit was not dampened. In line with her interest in the low caesarian section of laparotrichelotomy, she learned from a Japanese surgeon the “low spread technique’ in the same operation and became the first to follow it in the P.G.H. through all the vicissitudes of her country and family, she realized she had to go on serving and improving her own mastery of the medical profession.

When liberation came, she published a spate of medical articles, eight in 1946 alone and an average of 4 per year thereafter till 1955 inclusive, when she retired from government service, after two extensions.

At the liberation of Manila, she was appointed Chief of Obstetrics and Gynecology of the Provisional Philippine General Hospital, organized by the U.S. Army, with a salary of 224.00 per month. When the Commonwealth took over, she was recalled to U.P. as Professor and Head of the Department of Obstetrics, while also serving as Professor of Gynecology without compensation.

Of the thirty-nine articles that she wrote from 1946 till her retirement in 1955, at least seven were on chorioepithelioma, on which she would become, in the words of J.V. Greenhill, “the world’s greatest authority.” It was for the twelfth edition of the same Greenhill’s textbook on Obstetrics that she wrote the chapter “Diseases of the Chorion.
For her research work on choriocarcinoma, another name for chorioepithelioma, she likewise won an award from the Philippine College of Surgeons on November 3, 1954. She also concentrated on a related subject, the incidence of hydatidiform mole, which she found later to generally follow by choriocarcinoma. The other papers dealt on her accustomed subjects of research, including eclampsia, diseases incident to pregnancy and childbirth, nutrition, and the techniques of operative and on-operative delivery.

Even as she was writing and researching for these papers, she was teaching at the U.P. College of Medicine and serving as physician at the Philippine General Hospital. In 1946, she became a founding member and the first president of the Philippine Obstetrical and Gynecological Society, to which post she was re-elected once, being conferred the Forth Honorary Fellowship of the Society in 1951. It was likewise the year she received a citation from the U.P. Medical Alumni Society as “the foremost Philippine woman physician” of her country and the Presidential Medal for Medical research on the occasion of the fifth anniversary of the Philippine Republic. The preceding year, she had been accorded the Medical Award of the Federation of Women’s Clubs of the Philippines. She had also gone to New York to read a paper before the Fourth American and First International Congress in Obstetrics and Gynecology as delegate of the Philippine Medical Association, the Philippine Obstetrics and Gynecologic Society, and the Philippine Republic. On the way to the Congress, she had stopped at Women’s Medical College of Pennsylvania to be conferred the title of Doctor of Science, honoris causa, on the occasion of the centenary celebration of her alma mater.

The honors that she receive spurred her to work harder. On July 8, 1952, she was awarded a diploma and a medal by the Manila Medical Society for her “outstanding contribution in the fields of obstetrics and gynecology.” The following year in November, she was an official delegate of the Philippine College of Surgeons to the Eight Pacific Congress and the Fourth Far Eastern Prehistoric Congress in Manila. On September 26, 1953, she was accorded the Founder’s Award for the Association de Damas Filipinas on its Ruby Anniversary for “her contribution and service to the growth of the Association.” On December 19, the Philippine Obstetrical and Gynecological Society remembered her with a citation, as, its founder-first president. In 1954, she was at the 47th Annual Meeting of the Philippine Medical Association, presenting two papers on chorioadenoma, a tumor, and chorioepithelioma. In the next annual meeting, she read four papers, two on chorioepithelioma and two-on eclampsia. In the same year, from March 18 to June 10, she was in Australia and New Zealand for scientific investigations for the President of the Republic. In 1955, she was finally retired from government service, after having been extended twice. The U.P. Department of Obstetrics remembered her with a plaque of appreciation “for 45 years of devoted service, inspiring leadership and outstanding achievement in the field of obstetrics in this country.” The Faculty of the College of Medicine followed suit, commending on April 22 her “45 years of service devoted to medical education of the youth, to the administration of the sick and ailing, and to the elevation of the medical standards and ethics.” In the same month the U.P. Board of Regents appointed her Emeritus Professor of Obstetrics and Gynecology. In June finally, she received at the Manila Hotel the Presidential (Magsaysay) Award for being “a torch bearer in the Feminist Movement on the occasion of the Golden Jubilee of the National Federation of Women’s Clubs.”

Her lifetime of service, work and research had by no means ended. From 1956 to 1966, she wrote at least sixty-five papers, much more than what she wrote during the twenty-year period from 1933-1952, the peak of her career before retirement. At the age of seventy-
eight she published an article on choriocarcinoma. Aside from this, she continued to teach the 4th and 5th year medical students as Emeritus Professor at the U.P. College of Medicine, stopping only in 1968 “when age and infirmity prevented her from carrying on.” In 1958, we have a picture of her as seventy-year-old physician still practicing at the Philippine General Hospital:

Every morning about 7:30 a.m. she walks up that corridor, a white-haired, white-uniformed, short, stocky figure, trudging hastily, if with difficulty, past the surgical ward, the medical yard, the gynecological ward until she reaches the office where she daily keeps the many appointments on her crowded hospital schedule. She walks, head inclined downward in habitual disregard for everything except the path before her, deep in concentration, until she comes across a colleague or a student and her face breaks into a sudden bright smile. Except for the deliberate unevenness of her footfalls, she still moves with a certainty of direction unusual of her age.

Both at the P.G.H. and the U.P., she was serving without compensation, although with the same dedication.

Almost immediately after her retirement, the Board of Directors of the Philippine Obstetrical and Gynecological Society appointed her member of the Committee on National Mole and Chorioepithelioma Registry of the Philippines. She also became chairman of the Maternal Mortality Review of the same Society, a position which she would occupy till 1958. In the same year of 1956, she was practically everywhere. From January 28—February 8, she attended the First Regional Meeting of the Medical Women’s International Association, presiding over the symposium on the toxemias of pregnancy. On March 18, she received a diploma of merit from the U.P. Medical Alumni for her “distinguished work as professor of obstetrics, in grateful acknowledgement of her vital role in medical education, character development and intellectual guidance of these medical graduates who have been her students.” For Medicine Week, she spoke on September 18 at the Far Eastern University on the unwholesome obstetrical practice among Filipinos. She even found time to address the Medical Society of her native Pangasinan on hemorrhage after childbirth.

She was no less active in the following year. She was delegate of the Philippine Obstetrical and Gynecological Society to the First Asiatic Congress in Obstetrics and Gynecology held in Tokyo, Japan on April 2-4, 1957, presenting her “studies on Microscopically diagnosed chorioepithelioma” within the section on Deaths due to Belated Treatment. Back in the Philippines, on June 9,1957 she was awarded a certificate naming her “honorary alumna” of the U.P. College of Medicine. She was at the 50th annual P.M.A. meeting, with three papers, and at the 13th annual Philippine College of Surgeons meeting, with another set of three papers. At the First Filipino Family Conference, in the Philippine Women’s University she represented the Philippine Medical Women’s Association. She did not forget the Pangasinan Medical Society which heard her in Dagupan on another analysis of post-child-birth hemorrhage. She also talked on “pre-natal care” at Botica Boie on behalf of the Philippine Women’s Medical Association and on the effect of outside work on the health of mothers at a joint meeting of P.M.W.A., the Mental Health Association, and the Philippine Federation of Private Medical Practitioners. In December, she received the first prize of 600 from the Manila Medical Society for “the best clinical research work.”
At the age of seventy, in 1958, she went abroad to Montreal, Canada, as delegate of the Philippine Obstetrical and Gynecological Society, the Philippine College of Surgeons, the Philippine Research Council and the Philippine General Hospital to the Second World Congress of the International Federation of Gynecology and Obstetrics, held from June 19-28. In this Congress she presented a paper showing the relationship between low protein intake and the high incidence of hydatidiform mole and chorionic malignancy in the Philippines and other Asian countries. On the way back, she was guest speaker at the Staff Conference of the U.S. Army Medical Center in Camp Zawa, Japan, speaking there again on her favorite hydatidiform mole and choriocarcinoma. Back in the Philippines, she continued her busy schedule such as the fourth annual Philippine College of Surgeons meeting where she read three papers at the 51st annual Philippine Medical Association meeting, where she presented a paper; and at the Midwifery School, Manila Central University, where she gave a more popular talk on pre-natal care. There were also more awards and plaques, from the Philippine Obstetrical and Gynecological Society, the Association de Damas Filipinas and the Postgraduate Assembly of the Manila Medical Society.

The source of awards, certificates and other honors seemed to be inexhaustible. In 1959, she received six of them, the most important being the fifty-year medal from her alma mater in celebration of the Golden Anniversary of her graduation (1909-1959), the “Most Outstanding Woman Physician” award from the Philippine Medical Women’s Association, the “Most Outstanding Practitioner of Manila” plaque from the Philippine Medical Association. From 1960-1964, there were at least twenty of these honors, the most remarkable being the P.M.A. bronze diploma of merit for fifty years of dedicated service to humanity through unselﬁsh devotion to the principles and ideas of the medical profession and for the valuable contributions to . . . medical science” (April 28, 1962), as well as the citation from the U.P. Board of Regents for her “long and loyal service to the devoted commitment to the calling of a scholar and scientist; an exampler to the students and an esteemed colleague to her peers.” (September 28, 1963)

Her professional activities did not slacken for all the honors conferred to upon her. In 1959, she submitted a paper for the 52nd P.M.A. meeting, delivered the 71st Luis Guerrero lecture at the University of Santo Tomas on “gestational chorionic malignancy”, and presented three papers on her favorite hydatidiform mole, chorloadenoma and choriocarcinoma at the 15th P.G.S. annual meeting. In 1960, she again read a paper at the 53rd P.M.A. annual convention (May 23-28) and another one on the hydatidiform mole at the 16th P.C.S. annual convention in December. In 1961, she again attended both annual conventions, presenting two papers for the P.M.A. and three for the P.C.S. In 1962, at the age of seventy-four, she went to Cebu to read a paper on choriocarcinoma before the 55th P.M.A. conference. In Manila, she also presented another paper on the same subject before the first plenary meeting of the Philippine Academy of Sciences and Humanities. In 1963, she was at the 9th Congress of the Medical Women’s International Association in Manila. While she read no paper here, she presented one at the 56th P.M.A. annual convention and still another, this time on “Choriocarcinoma in the Philippines”, before the Philippine College of Surgeons on November 23, 1963, for which she received a plaque of appreciation and a cash prize. But this was not enough. In 1964, she would still leave the country top present a paper at a seminar in obstetrics and gynecology in San Francisco U.S.A. Subsequent to the seminar, she was also invited to speak before three medical societies in the same city. They also wanted to have her at Denver, Colorado, but she had to decline the invitation because she was anxious to return to the Philippines.
She was then seventy-six years and the trip must have taxed her considerably. But she still had a lot of energy in her, for she would retire from active life only in 1968, at the age of eighty. Even then, she had lived a life full of at least three active persons. Yet she was to live two years more, in complete possession of her faculties. When she quietly passed away on January 19, 1970 at the age of eighty-two, she was a victim of lobar pneumonia, a disease particularly fatal to the old. Outside, in the streets, the youth were in turmoil, the nation was in the grips of deep crisis, momentous changes were in the air.

Physician, Teacher and Scientist

She was, above all, a physician. That was what she set out to do, to heal men and women, particularly women in their most vulnerable and useful state — pregnancy and all its attendant ills. One could say with Garchitorena-Goloy in this “her enthusiasm for her calling” she never “wavered a bit since at the P.G.H. she called “ a sympathetic doctor.” It was said then time had not withered nor “custom staled the first early interest in her work.” The long years of hospital work had not hardened her suffering and death. She still felt “deeply with her patients in their throes of mental and physical anguish.” Taking care “to be almost always at the patient’s bedside” when she had a very serious case.

She was particularly mindful of the poor. In cases of discrimination by hospital attendants, she “always impressed on them that however poor a woman might be, she and her child deserving of the same care and consideration shown the well-to-do” for many a poor mother had, according to her, “given birth to boys who turned out to be great men, and who knows but those infants born of destitute mothers may some day become the saviors of the nation?” The baby was, as a matter of fact, just as important to her as the mother. In the thirties, she once told the attendant and nurses that “the new-born bebe . . . must be cared for and given the best of attention just as much as the mother.” Her researches on the nutrition of both mother and child attest to this primary preoccupation with their welfare.

She was also a physician who continued and was always willing to learn. She was the first to employ the low cesarean section in the Philippines. And when a Japanese appeared to have improved it, she was not averse to learning the new technique. She was pre-occupied with improving the technique of podalic version, so essential to affecting a normal childbirth in cases where the fetus does not present itself with the head first. All her other researches revolved around making pregnancy, childbirth and infancy much safer, whether they involved the head measurements, the newly-born and pelvic sizes of mothers or more recondite diseases attendant to motherhood like eclampsia or choriocarcinoma.

To facilitate the job of healing, she took care to inform her patients and would-be patients. She wrote numerous articles for the general public, from “Puberty” to “Some Facts a Filipino Wife or Prospective Mother Should Know” through “Sex Education” and “Prenatal Care.” Her advice always had a ring of sympathy, even as its authority was unmistakable, since it came from “one whose knowledge and acquaintance with the problems of both the maiden and the mother was comprehensive and longstanding.” One could say just as much about her teaching at the U.P. College of Medicine. That she was “simple and lucid in her expositions” must have gone without saying, for her
writing style attest fully to that, in the same manner that her knowledge of her subject matter must have been a source of inspiration to serious students. Her son, who most probably also became her student, says that “she activated her students to study and learn and tried to inculcate into the students’ minds the virtue of self-sufficiency.” Self-sufficiency and the almost insatiable thirst for knowledge were all too evident traits of her personality. All the awards and testimonials about her as a great teacher could not therefore have been made as a vain exercise in flattery, to which the object was in any case immune at the very outset. There is no reason to doubt that she had “given inspiration to younger minds . . . fired the imagination of those vocationally inclined to practice medicine.”

As teacher and physician, she might indeed have been in the first place. She was much greater as a scientist, even if she had not set out to be one. All her career as a scientist was based on a sincere desire to heal, to ease the sufferings of others. How was she as a scientist?

In her short biography of Dr. Acosta-Sison, Dra. Gloria T. Aragon emphasized in 1952 her original work on the formation of the lower uterine segment, the origin of the amniotic fluid, the pathology of eclampsia, and the early clinical diagnosis of hydatidiform mole, particularly because her results had invention of the sagittal pelvimeter and a single-bladed forceps “to facilitate delivery of the fetal head in laparotrachelotomy” or low cesarian section was also considered important, together with her studies on pelvimetry and cephalometry among Filipinos.

In 1968, Dr. Antonio S. Fernando seemed to have been particularly impressed by her having performed the first low cesarian, which brought about the abandonment of the classical technique in the Philippines. Her pelvi, cephalometric researches were just as interesting as her first article on clinical chorioepithelioma in 1937 and the fact that from 1910 to 1953, Dra. Acosta-Sison’s contributions to learned journals on obstetrics and gynecology represented 24% (actually 31½%) of the total.

Finally, in his memorial address, Dr. Jose R. Villanueva called her the “Mother of Philippine Obstetrics.” To him, she was important for having “established normal pelvimetry among Filipino women and cephalometry among Filipino newborns,” the internal diameters having been determined “by direct measurements in the female cadaver; for her contribution on the origin of the lower uterine segment, as noted by Ricci in his book Extraperitoneal Cesarean Section; for having clarified the origin of the amniotic fluid; for having introduced laparotrachelotomy and simplified the technique of internal podalic version; and for her work on eclampsia and choriocarcinoma, as well as on the nutrition of both mother and child, particularly the correlation she presented between low protein intake and high incidence of hydatidiform mole and chorionic malignancy in Asia and the Philippines. Dr. Villanueva concluded that “Dr. Acosta-Sison will be remembered by the scientific world for her works on choriocarcinoma.” He thus joined the judgement of Greenhill that she was the greatest authority in the world on that disease.

Whatever the final worth of her contribution to medical science, they were made out of a deep compassion for the suffering of women. They proceeded from an awareness of actual problems, of a real need to alleviate pain, to help real people. They were the response of a human being in the face of actual human suffering.
Dra. Honoria Acosta-Sison As A Person

At the very base of all her achievement, was Honoria the person. And at the core of her personality was a definite idea about what human being should be, making her life a moral commitment at the very outset. A basic concept to her was “purity”. In her childhood, she was told by her aunt that “purity is a treasure girls must possess.” Like a glass, it could never be put together again when broken. “Being only a small girl of five or six years,” she confides in her short autobiographical sketch, “I was not conscious of the full implication of the instruction but the forcefulness of the simile never left me through the years.”

This was the reason for the simplicity of her ways. Relating her mother’s fondness for beautiful dresses, she took care to add that it was “a trait something I had not inherited.” And it was truth. She was not very much concerned with the outer trappings of feminity, although a portrait of her in 1913 and a family picture of 1933 showed her to be quite feminine, demurely feminine, hiding the inner forces and determination that were at the wellsprings of her life. In 1958, Garchitorena-Goloy observed that her cubicle in the P.G.H. looked cramped and unostentatious with varied but remarkably utilitarian furnitures. One found it in “none of the pointless decorative items a woman likely to display in the place she works in.”

There was a certain practicality about her that was not lost even in the expression of deep sentiment. In the twenties, when her husband was going on a trip to Europe and America, she wrote him a beautiful note, which reads thus:

My dearest and ever dearest Antonio,

Think not with sadness of us whom you leave behind but rather rejoice in that now your chance of glory has come. Make the most of it, for remember every gain you make will make us happier and better. Make the Holy Virgin your constant guide. She will surely help you as she has helped us. Our spirit of true and understanding love will always follow and cheer you were ever you go.

Your Honoria and Children

It was a poignant expression of marital love. But, at the back of the same sheet of paper, Honoria wrote some practical instructions to her beloved husband:

Go to Royal Society of Medicine at 1 Wimpole St. W.E. for gral. Information as to hospitals and men. Secretary is on the 4th floor. On 1st floor is a list of operations performed daily in different hospitals. The library is on the 2nd floor. You must show you are a bonafide physician to read there. — See Brompton Hosp. For diseases of chest. Other big gral. Hosp. are St. Thomas, St. Bartholomew and London. Do not fail to see Hunterian Museum, Parliamentary Bldg. and the Tower of London.
There are 2 reasonable chopsuey houses on Creek St. (Small st.) near Oxford St. They are called Shanghai and Canton Restaurant. There is another more stylish and more expensive but the cooking is not so good at Wardour St. near Picadilly Circus — Hotels around Russel Square are many hotels. White Hall (three are many of the same car) is fairly clean and decent.

And she continued with a “suggestion as part of subject of investigation”, concluding with the inevitable, “buy me” in Paris, but the items were not perfume or lingerie; they included: 1 Demelon forceps, with the instruction that “Gynecological and obst. Instruments may be bought in 41 Rue de Rivoli Paris - Find out also the cost of 1 obstet. Maniquin.

She had an inner life to which she could retire from the cross of practical existence. This was what she probably wanted to complete or extend when she took up courses in philosophy and psychology in the thirties. We have a portrait of her then by that anonymous Philippine Free Press writer:

Outwardly, Dr. Acosta-Sison may appear like other women-physicians, like other members of her sex. But there is another Honoraria Acosta-Sison who reveals herself only when you touch the door that leads to the higher realms of life - to poetry and philosophy and the great men and women who have lived and dwelt in such an atmosphere. It is only then, she confesses, that she actually lives and senses the beauty of life and the wonders of God’s handwork. Alone with her books and her thoughts she exists in a world by herself where the somberness of operating rooms, the agony of suffering women, yes, even the vociferous chatter of children at play or of students in the school-room, have completely vanished. But seldom can she indulge herself, float in the land of dreams and thinking soon comes the call of the world and its round of pressing duties...

So you will find her most of the time, the plain, practical, ready-for-any emergency Dr. Honoraria Acosta-Sison.

Her son Antonio believes that “throughout her life, she never gave up reading, doing this “during her spare time”, the time when she could commune with her inner self, extract new strength from her inner resources. It was also then that she could write what later would appear to her as the naïve outpouring of an anguished soul eagerly seeking to follow the gleam.

In her more popular writings, purity would remain a constant theme. In her article on “Sex Education”, for instance she observed that in an age “where sensual pleasure and gratification are placed above character building through self-sacrifice, conditions are not favorable for purity.” For her sex education was the [proper understanding of ourselves of which sex is but a part to be harnessed and directed by a higher integrating principle - a goal, an ideal - who will enable us as a personal whole to rise we should be.” The wholeness of he person in relation to a guiding “gleam” was the object of purity.

This awareness was the main source of her strength in life, she felt that the Filipinos were losing “our ideals, which make life worth living... the principles of respect for others, honesty, truth, honor, virtue which were our heritage,” It was the nineteenth century
which the modern American-trained medical doctor was carrying deeply in her, "the strong bulwark of our daily lives" buffeted by the winds of change, "replaced by indifferences, wantonness and arrogant cynicism. Yet, for her, our country “must live and live in decency and righteousness,” a responsibility which no one else can take save the “Filipinos themselves.”

This many sound like preaching to the modern ear; but the high moral sense that infused her life was the very motive power of her achievement. It was her striving for the wholeness of life, the purity of the human being, that was at the base of her creativity. It was also what made her think of life as principally a service to other. For, in the words of Dr. Villanueva, “to her, life was a mission to serve, not to enjoy.

Dra. Acoseta-Sison’s life was more than just a mission to serve. It was the fulfillment of an inner certainty, the constancy to a “gleam”. Viewed from this perspective it was, from within and from without, a “gem” of purest ray.

NOTES

3. The ratios are very rough estimates, since they were derived by simple division of the population figures for 1903., 1928, and 1960) of the 1971 Statistical Handbook of the Philippines) by the total number of registered physicians for the respective years (1905 and 1920 for the 1903 and 1918, census figures).
10. Ibid., p. 59.
12. Ibid., p. 212.
14. In her brief biographical account, Dra. Sison simply says: I was accepted as a teachers for the first grade but continued my studies with other teachers in the afternoons” (loc., p. 213).
16. Acosta-Sison, p. 212
18. Acosta-sison, p. 211.
20. Ibid., p. 211., “The date of December 30, 1888 was given by Dr. Acosta-Sison’s son, Dr. Antonio Sison whom we interviewed on May 25, 1974 (of Appendix A). In her article “Honoria Acosta-Sison, M.D. A short Biography,” Dr. Gloria T. Aragon gives the date of December 30, 1890, whereas Dr. Jose R. Villanueva gave her the age of 88 when she passed away on January 19, 1970 (In Memoriam”, Acts Medica Filipina, VI (series 2): 2(April-June 1970), p. 173), which would make her date of birth fall in 1887. This seems to be the correct date, since it is the one found in her Student Record (no. 297) in the U.P>, where she was admitted to the Journal of the Philippine Medical Association, XLVI:4 (April 1970), where she wrote that she was due for retirement on December 30, 1953 (p.217).
22. Ibid, p. 211-212. In the anonymous Philippine Free Press article, “First Filipina Physician”, Honoria is made out as “the favorite among three children” (p. 45).
23. Acosta-Sison, p. 213.
24. Ibid,
25. Ibid.
27. Ibid; Sison, Dra. Honoraria,” p. 47.
31. Ibid.
40. Interview, p. 2.
42. U.P. Student’s Record of Acosta-Sison, Honoria.
43. curriculum Vitae, loc.; Acosta-Sison, “Presidential Address,” p. 322.
45. Interview, pp. 4-5.
55. Honoría, Acosta-Sison, “To those who asked me to write,” typescript.
56. Curriculum vitae, loc. cit.; Aragon, pp. 63.
57. Curriculum vitae, loc. cit.
60. Curriculum vitae, loc. cit.; Garchitorena-Goloy, p. 11; Aragon, p. 64.
63. Ibid; Curriculum vitae, loc. cit.
64. Ibid, Curriculum-Goloy p. 11.
65. Ibid, Curriculum vitae, loc. cit.
69. Ibid, pp. 45-46.
70. Garchitorena-Goloy, p. 10.
71. Interview, p. 6.
72. Aragon, p. 64.
73. Ibid, pp. 63-64.
74. Filipino Pioneers, 61.
77. Ibid, p. 211.

83. The Advent of Filipino women in Medicine, The golden book of the Philippine Medical Association (Edited by Dr. Antonio S. Fernando, 322 p.) 1953, p. 320-322.


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VILLANUEVA, JOSE Nutrition of Women During Pregnancy with Philippine Food Material,
BIENVENIDO MARIA GONZALEZ
Geneticist and Educator

BIENVENIDO MARIA GONZALEZ, Ph. D. in animal husbandry, made history when he was formally installed as the sixth president of the University of the Philippines on 19 October 1939. He was the first alumnus and scientist and at 46, the youngest to head the state university founded in 1908.

Dr. Gonzalez, assumption of the U.P. presidency, it has been said, was “foreordained by family tradition, he literally stepped into the shoes of his father, Dr. Joaquin Gonzalez, the first president of the first state University of the Philippines – the Literaria de Filipinas – which was established by presidential decree promulgated on 19 October 1898 by Emilio Aguinaldo of the erstwhile First Philippine Republic at Malolos. Don Joaquin was also the first director of civil service appointed by the first civil governor of the Philippines, William Howard Taft.

Exactly 41 years separated the Inductions of father and son as heads of two state universities. The Universidad Literaria de Filipinas was, understandably enough, co-terminous with the first republic which formally went out of existence with Aguinaldo’s capture in Palanan, Isabela, on 23 March 1901. The University of the Philippines, the second state university was born seven years later during the first decade of American occupation. The fact that it did not take long for the Americans to establish a university in the Philippines is proof of the high degree of culture and civilization of the Filipinos, contrary to the American expansionists claim at the turn of the century that the country was peopled by savages and barbarians.

The younger Gonzales’ election to the U.P. presidency came 11 years after serving as dean of the U.P. Colleges of Agriculture in Los Baños, Laguna, the first Filipino to occupy that position, and 26 years after landing his first job in the state university on 3 December 1913 as a 100 peso-a-month assistant in animal husbandry. To the idealist but resolute Gonzalez the position, however, humble, provided the initial push to drive on towards the summit of his educational career. Shortly after his election as a president, he started the U.P. board of regents with the following revelation: “In my humble way, silently but unceasingly, for the last twenty years, I have been reading, studying and preparing for the position of president. Not that I knew I was going to be offered it, but because I felt it
the duty of every faculty member to prepare himself for the time when the call for a higher service might be made.

No doubt Dr. Gonzalez was most adequately prepared to respond to the “call” made by the U.P. board of regents on 20 April 1939 with of course, the indispensable blessing of President Manuel L. Quezon. In fact, Dean Gonzalez had to make three trips from Los Baños to Manila, by “college car”, the first on the 13th of April when Quezon “offered” him the position of U.P. president, the second on the 20th when the U.P. board of regents made the formal election, and the third on the 21st when Gonzalez was sworn into his new office by Quezon himself. Gonzalez readiness to assume the exalted position was indicative of his character: he just could not afford to take a long chance when his goal as educator was at stake. To survive in education, he advised fellow teachers, obviously drawing from his own personal experience, we should not depend on a wooden sword when we need one of steel. That would be to invite disaster.

From mere assistant in animal husbandry, one rung lower than that of instructor, to president of the state university was indeed, a marvelous achievement that called for a fitting celebration. For four consecutive days, 16th to 19th of October 1939, the University of the Philippines was in a gala mood. The 16th of course, marked the inauguration of Gonzalez presidential term, but his formal induction was deferred to the 19th to bring home the full historical implications of the occasion. Hundreds of universities and institutions of higher learning throughout the world sent representatives, in many cases their own academic presidents, to the Gonzalez inauguration.

It was probably the most history-oriented installation of a university president ever held in the country. October 16th was chosen as the opening day to commemorate the 32nd anniversary of the inauguration of the First Philippine Assembly on 16 October 1907 as well as the 13th anniversary of the opening of the first Philippine Senate on 16 October 1916. Apparently not satisfied with the double significance of the opening day, Dr. Gonzalez was formally installed as president on October 19th, the 41st anniversary of the promulgation of the Aguinaldo decree creating the Universidad Literaria de Filipinas. But unlike his son, Dr. Joaquin Gonzales, Pampanga delegate to the Malolos Constitutional Convention, was elected not by a board of regents but by his own peers making up the star-studded faculty of the first state university.

One of the highlights of the Gonzalez inauguration was a military parade and review held by the U.P. cadet corps. Prominently seated at the reviewing stand were two surviving faculty members of the Universidad Literaria de Filipinas, namely, Dr. Jose Albert, professor of obstetrics in the college of medicine and surgery, and Dr. Manuel V. del Rosario, professor of organic chemistry in the college of pharmacy. The spirit of ‘98 came to life on that occasion. But the spirit of the late ‘30’s, the Commonwealth era before world War 11, proved even more vibrant and colorful. President Quezon himself, obviously proud of his own protégé, delivered the address of greeting after a short invocation by Msgr. Michael J. O’Doherty, the archbishop of Manila; Jose C. Bacobo, secretary of public instruction, made the formal installation of Gonzalez, who thereafter delivered his inaugural address.Sharing the huge platform with the new president were the members of U.P. board of regents, the highest administrative organ of the university.

What kind of administrator was this new president of the nation’s highest educational institution? On 24 October 1938, one hundred and four faculty members of the U.P. College of Agriculture signed a resolution extolling Gonzalez upon completion of a decade of service as dean of the college. The resolution enumerated Gonzalez outstanding accomplishments, namely, “improvement of teaching and research
equipment; unstinted encouragement of scientific investigation; sustained research output; increasing public recognition of the value of graduates of the college of Agriculture, strengthening of the morale and spirit de corps of the staff by unswerving application of the merit system in personal advancement; steady improvement of the college groups and buildings; and, finally his teaching by example of his principles of truth, loyalty to convictions, and fair dealing.” Gonzalez colleagues also commended him for his “apostleship of the cause of scientific research in the Philippines.

The eighth of ten sons of Dr. Joaquin Gonzalez of Baliuag, Bulacan and the former Florencia Sioco of Bacolor, Pampanga, Bienvenido M. Gonzalez was born on 22 March 1893 in Apalit, Pampanga. His paternal grandfather was a Spanish lawyer, Fausto Gonzalez of Zamora, Spain who came to the Philippines in the first half of the 19th century and married Maria Amparo Angeles, a native of Baliuag. In other words, Joaquin was a mestindo, half-Spanish and half-Indo. The Gonzalezes of Bulacan must have been a family of means for Joaquin, who was born on 22 July 1853, finished his medical course at the University of Madrid, Spain.

Recognized as one of the most outstanding eye-specialists of his time Dr. Joaquin Gonzalez was the unanimous choice of the faculty for president when the Universidad Literaria de Filipinas was established. He had also made researches in botany even before his election to the Malolos Congress. He was credited with the discovery of the medicinal value of some Philippine plants which he used extensively in his medical practice in rural areas. A linguist, he spoke Spanish, English, French, German, Italian, Latin and Greek.

Gonzalez knowledge of English came in handy during the Philippine revolution. In the battle of Calumpit, Bulacan, Joaquin, wounded in the arm, convinced General Antonio Luna to withdraw with him across the river to Pampanga, thus saving the latter from capture by the enemy. Pursued by the Americans in Pampanga, Joaquin and his family lavishly entertained the American officers at their palatial home in Apalit, saving the Pampanga towns from being put to the torch, and more importantly giving Luna ample time to organize a strong contingent that engaged the enemy in the battle of Minalin.

In 1884 Dr. Joaquin Gonzalez married Florencia Sioco, whose parents, don Jose Sioco and Matea Rodriguez, were the richest in Pampanga. Don Jose was a direct descendant of a Japanese captain named Sioco who came to the Philippines with Limahong’s Armanda in November 1574. The invaders, however, were met with stiff resistance by Spanish and native troops. During the greatest and last engagement with the native defenders Sioco was slain, forcing Limahong to take flight with the remnants of his invasions forces. Widowed after giving birth to nine children, Matea was nevertheless able to increase the family fortune and succeeded in giving all her children the best local and foreign university education.

The Gonzalez home in Apalit was described by local residents as a “house of diplomas” because all members of the family sported college diplomas. Inheriting a rich intellectual tradition, Bienvenido did not need any prodding from his parents to acquire a good education. He took his early schooling at the Colegio de San Juan de Letran (1902-1905) and at the Sampaloc Intermediate School (1908-1910). With such substantial preparatory training he was ready to pursue a career.

It is interesting to know why a rich man’s son like Bienvenido pursued a course in animal husbandry instead of one of those prestige professions like medicine and law. After two
years in the normal school he went straight to the U.P. college of Agriculture. Why? The answer lies in a childhood incident which wounded the young Gonzalez amor propio. The boy, so the story goes, accidentally saw two mother sows fight to death, leaving an orphaned litter a nine which he tried to nurse and feed to the best of his knowledge. But the piglets despite his attention and trouble, died one after the other until only a few were left. In utter disgust, he gave the survivors away to a farmer's housewife, an illiterate woman, who reared them up into robust young pigs. It was a humiliating experience for young Gonzalez who then and there decided that when he grew up, he would enter the U.P. College of Agriculture to take up animal husbandry.

The boy's decision became a young man's challenge. In 1910, at age 17, Gonzalez enrolled at Los Baños and three years later, on 4 April 1913, he obtained the degree of B.S. in agriculture. The college authorities must have been impressed by Gonzalez performances for hardly eight months after his graduation he was appointed assistant instructor in animal husbandry. Again, as assistant, he might have convinced his superiors that he had the makings of a good scientist that, seven months later, he was awarded a university fellowship (1914-1916) in the United States under Act No. 2095. After intensive graduate studies he obtained his M.S. on agriculture from the University of Wisconsin on 16 June 1915. Returning to the Philippines on 12 June 1916, he was appointed instructor in animal husbandry in his Alma Mater.

A man of great initiative Gonzalez, upon his appointment as instructor, set up his own department of animal husbandry. Displaying unusual zest and skill as an organizer, he sent an urgent appeal to U.P. President Ignacio Villamor for farm animals to stock his department, but the latter, for lack of appropriations, could discourage the resourceful young instructor for he went ahead with his plans until, after a few years, his department became one of the largest in the college.

Gonzalez was by no means an armchair specialist. His enthusiasm and talent could not be confined within the four walls of a school room. He had to relate his activities to the life of the community. On 20 October 1916, he was elected president and manager of the College Cooperative Company, Inc., which he himself inspired and organized. In the same year he started in-depth studies on improving the quality of local breed of chicken and swine. After a series of laborious and painstaking experiments, he achieved, in his first year as instructor, what full-fledged professors of many years experience might have viewed with envy; the successful breeding of Cantones chicken and "Berkjala swine.

Definitely Gonzalez had the makings of a great scientist. But the scientist is also human. On the 1st of January 1917, he married Concepcion Rafols of Leyte, then academic supervisor in the city schools of Manila. This wedlock was subsequently blessed with five children: Manuel, an engineer; Gonzalo, lawyer; Eva, instructor in home economics; and Bienvenido Jr. Being a family man did not deter his rapid rise on the educational ladder. On 1 July 1917 he was promoted to assistant professor of animal husbandry after a period of only one year as instructor – indeed, a remarkable record.

It was during his term as assistant professor that he was appointed on 2 October 1917 business manager of the Philippine Agriculturist, a learned journal, which he later edited for several years. But the crowning glory of his teaching career, up to this point, was his election to the U.P. board of regents on 2 September 1918. He held his additional post for three years, 1918-1921. He was barely 25 when he first sat in the highest administrative council of the state university; surely he was on the way up. Jumping over the heads of
many senior faculty members, he was appointed associate professor and then full professor in a period of only 12 months, 1 January 1919 and 1 January 1920, respectively. He was the youngest (27) to hold the rank of professor. On 25 March 1921 he was awarded his second fellowship abroad, and in less than two years (22 February 1923) he was conferred the degree of Doctor of Science by the Johns Hopkins University. Upon his return he was appointed head of the U.P. College Department of Animal Husbandry.

Several more extra-curricular jobs in addition to his regular academic functions, were thrown into his lap as he moved steadily towards the apex of his Los Baños career. These included the position of president, Los Baños Biological Club (1923); president, Maquiling School, Inc. (1924); secretary, Seventh Philippine Agricultural Congress (1926); delegate, Third Pan-Pacific Science Congress in Tokyo (1926); director, Pampanga Sugar Development Co., Inc. (1927); and editor, Philippine Agriculturist (1927).

The prize plum – the deanship of the U.P. College of Agriculture – was awarded to him on 24 October 1928. He was the first Filipino to head the world-removed college, and the youngest (35). Like Alexander the Great, he must have scanned the horizon of Los Baños and said to himself there were no more worlds to conquer. The next trophy must henceforth be sought and won outside the little world of Los Baños.

As a scientist, Gonzalez’ forte was genetics – that branch of biology dealing with heredity and its variations in animals and plants. Specifically he concentrated his enormous talent on animal genetics, i.e. improving the quality of animals, their adaptability, fertility, resistance to disease, etc. From this specialization, his adventurous spirit and inquisitive mind inevitably wandered, it is interesting to note, into a much higher plane of endeavor the improvement of the Filipino race, mainly through education. But this latter task was still 11 years away from his appointment as dean.

Soon after he became instructor in animal husbandry, Gonzalez decided that his immediate task was to reinforce his credentials. This he accomplished in just one year (1916). First, he disproved the idea, long held here, that Philippine livestock could be improved through the costly importation of standard improved breed of animals from temperate countries. Experience had amply shown that such pure breeds from a cooler climate, when brought here, quickly sickened and died. They had poor adaptability to the tropical environment. At this point Gonzalez got hold of two improved breeds of swine the offspring of the Jersey, originally imported from the United States and born at the Alabang Stock Farm, and had them crossed with a native swine in Jala-jala, Rizal province, whose paternal ancestors, the Breton breed, were imported into the Philippines more than a century ago by Dr. Paul de Gironiere. The resulting offspring came to be known as the Berkjala, which proved to be well adapted to the local environment aside from having a bigger size, higher fertility, greater resistance to disease, and early maturity. The Berkjala swine have also the quality of quick and economical fattening, and the characteristics of being “good mothers”. Definitely this was the first feather in the cap of Gonzalez as a geneticist.

Not content with just one contribution to Philippine science, Gonzalez then turned his attention to the native chicken. Through careful mass selection and inbreeding, he developed in his Los Baños poultry farm a new strain of Cantonese chicken which was much improved from the original fowls imported from Canton, China. This new breed of Cantonese chicken is far superior to the native fowls in size, quality of meat and number of eggs. They are owners house, they don’t fly over the fence or rooftops, and they
exhibit more adaptability to intensive culture. Through a series of experiments Gonzalez breed into “200-eggers,” i.e. each hen (layer) capable of producing 200 eggs in one year, thus providing a tremendous boost to the income of poultry raisers.

The third important Gonzalez contribution is the Philamin beef draft cattle, a successful cross-breeding of the native Hereford and Nellore, which he developed in 1920 when he was already professor of animal husbandry. Earlier he had noted that native animals were small and had low productivity. Through continuous scientific grading and selection, production of quality feeds, and adoption of prophylactic measures to increase disease resistance, he developed in Los Baños the beginnings of a superior strain of cattle for food as well as for farm work.

Such were Gonzalez’ solid achievements in the field of genetics that a fellow scientist was prompted to say: If Dr. Gonzalez had done nothing more than give the country these three improve breeds of livestock, he could have rested in his work, content in the assurance that he had accomplished the task of a lifetime.

Another but little appreciated contributions of Gonzalez to science was his experimental studies on the duration of life when he was taking his doctorate at the Johns Hopkins University. Using a total of 24,287 flies known by scientific name Drosophila melanogaster, he conducted his experiments in the laboratory of Dr. Raymond Pearl, World-famous geneticist, in the department of biometry and vital statistics, School of Hygiene and Public Health, Johns Hopkins University. Gonzalez proved that under constant environmental extreme precision and exactness with the presence or absence of certain genes in the chromosomes. These genes also control certain morphological characters. Gonzalez also showed some mutant factors that affect the sexes, hence their duration of life.

A first-rate scientist and administrators, Gonzalez told the faculty of the U.P. college of Agriculture: I want every product of this College, whether it be a student, a plant, a domestic animal, or a sterling on silver. This remark subsequently became the Gonzalez “trademark”.

From the parochial world of a college scientist to the limitless intellectual domain of a university president is indeed, a big leap. But Gonzalez did it. The scientist and educator combined to make up a giant personality – a man among men.

Among the Gonzalez papers now depositen in the archives section of the U.P. library is an 8-page summary account of his significant trips from 25 July 1914 to 31 December 1941. This summary account is important in that it gives an insight into the character of the man – his intellectual honesty, high sense of duty and moral values, unselfishness and dedication to truth. The first trip involved his first fellowship (1914-1916) to the University of Wisconsin. This entry is the first trip to Mindanao – covering the period from April to May 1917. It says that although his original trip was for the purpose of visiting his wife’s parents in Cebu, it was extended to Mindanao on invitation of American Governor F. W. Carpenter of the Department Mindanao and Sulu to “gain an idea of the adaptability of the island to stock raising. “ the nature of the trip, it is obvious was worth its extension.

The purpose of his next trip to Mindanao and Sulu (May 1919) was to “inspect government cattle ranches of the Bureau of Non-Christian Tribes advice on the suitability of locations, and suggest possible improvements in their administration and management. In April 1920 he made a trip to Nueva Vizcaya and the Mountain Province
also for the establishment of government cattle ranches.” These trips, it must be noted, were strictly outside his regular academic functions; but he undertook them, nevertheless, to relate his knowledge to the life of the community.

He mentioned his second fellowship (1921-1923) to the Johns Hopkins University. Reference is made to many supporting papers and an article, “Here and There among Agricultural Colleges in Europe. He also made a trip to Darwin, Australia, via the British North Borneo and Java, to “study the livestock industry of the region. Then he went to Tokyo in 1926 to represent the Philippines in the Third Pan-Pacific Science Congress. He wrote a series of five articles in the proceedings of the Congress.

Dr. Gonzalez was frank enough to state that he made a trip to Baguio via Pampanga in April 1930 with his family to rest. But during his stay in the Pines City he held informal conferences with American educators on the work of the department of agricultural education, which he was to head, in a concurrent capacity, in addition to the department of animal husbandry. On the 30th of May he proceeded to jala-jala, Rizal province to visit the home of the Jala-Jala pig. His administrative functions having expanded he visited San Pablo, lucena, Tayabas, Lucban, Sampaloc, Mauban, Atimonan, Gumaca, Sta Cruz, and Pansanjan in Laguna and Tayabas (now Quezon) provinces to “study economic conditions in the coconut regions.

A man with a wealth of experience as scientist ad educator, Dr. Gonzalez was invited to deliver commencement and convocation speeches in many universities, colleges and rural high schools throughout the country. Gonzalez wide range of activities reflected primarily on the acknowledged leadership of the state university and secondarily, on his progressive and enlightened role as educator and civic leader.

Even as dean of the U.P. College of Agriculture and later on as president of the state university, Dr. Gonzalez did not allow his enormous talent to be confined within the narrow cubicle of his office. He maintained and continually reinforced his links with the community as evidenced by the many extra-curricular positions he held with great distinction. He was the rare type of man who did more honor to his job than vice versa.

On 19 January 1931 he became a member of the Society for the Advancement of Research. In due course he assumed other positions namely, president Philippine Society of Technical Agriculturists (1931); president, UP Chapter, Phi Kappa Phi (1933); director, National Development Company (1943); member and fellow, American Association for Advancement of Science (1934); vice-chairman, National Research council of the Philippines (1938); president, Laguna Council, Boy Scouts of the Philippines (1938); member, executive board, UP Alumni Association (1939); vice-president, Pampanga Sugar Development company, Inc. (1939);

Member, Board of Review for Moving Pictures (January 1940); chairman, Board of Review for Moving Pictures (February 1940); member, National Council of Education (1941); vice-president, Pambul, Inc. (1941); chairman, Metropolitan Manila Planning Association (1945-11947); member and later chairman, board of directors, Agricultural and Industrial Bank (1945-1946); chairman Governing Council, national Housing Commission (1945-11947); chairman, advisory board, Philippine War Relief of US, (1946-1949); member, national Urban Planning commission (1946-1949); director American Oxygen Co. (1947-1949); chairman, board of regents, Institute of Science (1947-1949); chairman governing council, People’s Homestead and Housing, Corporation (1947-11949); member national Commission on Educational Scientific, and Cultural Matters (1948-1949); and director,
United State Educational foundation in the Philippines (1948-1949). His fields of interest included education, science, agriculture, social welfare and industry.

Of the honors accorded Dr. Gonzalez at least two stand prominently namely, inclusion in the University of Wisconsin's Hall of Fame, and the award of a gold medal and diploma of honor by the UP Alumni Association on 2 April 1940, for his “unselfish and substantial service to the cause of education in the Philippines. His name is also listed in the American Man of Science (1943-1949); Who's Who in America (1942; Who's who in American Education (1949-1950); and Leaders in US Education (1948).

The best guide to an assessment of Dr. Gonzalez as a thinker is provided by his addresses and articles in scientific journals and popular magazines. For instance, writing on research in the natural sciences, he distinguishes the true scientist from the pseudo-scientist as follows:

“Open mind is a necessary attitude of the scientist. .. A true scientist faces the facts as they come to light, seeking plausible explanation for the unexpected events, but always endeavoring to adjust his theories to the observed facts rather than adjusting the facts to his theories. It is at this juncture where the real scientist and the pseudo-scientist part ways. The first with a flexible view forges ahead, modifying his views and modes of attack in the problem on hand as he goes along, distorting facts, with the least plausibility, to make them fit his preconceived theory.

What people a scientist to go on in his slow and painstaking research? Gonzalez answers it thus: There is no scientist who does not start a piece of research with the goal of making a discovery of such transcendent importance, of such far-reaching benefit to mankind as to startle and make the world sit up and take notice. All researchers aim for the bigger prizes in science - renown, recognition, and material comforts for one’s old age – although not all may readily admit it. Yet, how many finally obtain them! The big prizes in science are almost as scarce as the purses in a lottery. In the same manner, however, as the thousands of losers make one victor possible, so in science the big discoveries, the monumental accomplishments, are built up largely from the results of efforts of many other scientists and painstaking over numerous small details.

A scientist is also a citizen who thinks of the national security of his country. Here is scientist Gonzalez relevant observation on this important subject: Sound statesmanship dictates that the security and wellbeing of a nation depends on a number of factors, not the least of which are those concerned with the material necessities of life. The basic causes of aggression, unrest, and rebellion in the world.. are largely material, revolving around the needs of the people for food and everyday protection from the weather. Given an adequate supply of these necessities, it is easy for nations and their populations to be not only contented but even generous and charitable toward their neighbors. It follows, therefore, that one way of preserving peace internally is to keep the people well fed and adequately clothed and sheltered. Once these necessities are provided, it will be much easier to cultivate the more altruistic sentiments of patriotism, religion, and culture; and enough energy will be held in reserve to be drawn upon for national defense and protection. As the resources of the country are largely agricultural, provisions for the gradual and steady development should not be neglected constituting as they do the basic safeguards for the security of this young nation.

In science, according to Gonzalez, the right man properly trained is “still the biggest thing.” They would be scientist has to undergo a long period of study and preparation to
be able to use the working tools of knowledge and experience painfully acquired through attendance in formal classes, conferences, scientific meetings, conventions; by reading scientific journals, monographs and treatises. He adds that a great mass of knowledge has accumulated in science that only specialists can hope to master the latest information on any particular subject. The state university contributes to the development of scientists by appointing pensionados to study in the best educational centers of the world.

In 1938, long before Philippine independence, Dr. Gonzalez was already thinking of the problems of economic adjustment of the country after the severance of colonial ties with the United States. He said that under the free trade relations with the US starting in 1909, Philippine agriculture became greatly specialized and production centered on a few crops, notably sugar, coconut oil, abaca, and tobacco resulting in the retardation of many local industries like handicrafts, which were either abandoned or greatly neglected. Withdrawal of our favored position in the American market, he said, would necessitate the production of commodities which the country had been purchasing with the returns from the sale of the specialized products. The development of handicrafts and the raising of a great variety of crops would be greatly stimulated. On the whole the national economy must be geared closely to agricultural development. Even the government would have to be reorganized and simplified. This would be call for a great deal of sacrifice and the strictest discipline as the necessary basis for national order.

Should the national leadership fail, Gonzalez warned, “or should the response of the people be inadequate, then the only other alternative is civil war. The forced discipline that is imposed by civil strife will eventually drive the stranger groups to concerted action until opposition to the existing order is finally overcome. Then there will be the resurgence of a virile country baptized in blood. The fore-going is on the assumption that a foreign power does not intervene and lend a hand in the pacification and eventual subjugation of the Philippines once more.

Concerning adjustments in Philippine animal industries, Dr. Gonzalez considered the imposition of adequate tariffs to encourage the people to actively engage in animal production on a commercial scale. To make the country self-sustaining in beef, dairy products, hams, leather, and eggs, the people need government protection from foreign competition. This is all that is necessary, he said, as the Philippine had adequate land, feeds, and labor for intensified animal production. He also stressed the importance of research institutions to promote studies dealing with the development of improved breeding stocks, investigation on the value of feeds and the best methods of combining feeds to secure the most economical results.

It was characteristic of Dr. Gonzalez to view everything from the standpoint of a scientist. Things do not just happen, he often said, adding that “events succeed one another according to certain immutable laws that leave little to chance. He attributed the tremendous strides in human progress to a relatively few individuals who, at the risk of their lives, dared lift the veil of mystery that covered the secrets of nature and gradually and painstakingly sought to understand its manner of working and, in understanding it, harnessed its forces and put them his services.

It is interesting to recall that Gonzalez’s appointment in 1928 as dean of the UP College of Agriculture provoked a bitter controversy and almost precipitated a students’ strike and the resignation of part of the faculty. The opposition expressed serious doubts about his competence to handle the job. Even long after e appointment some “four or five men”
persisted in their efforts to oust Gonzalez from the deanship. The young dean, unruffled by the outcry, went on discharging his functions to the best of his ability. Eleven years later he was elected president of the University of the Philippines.

Recalling the opposition to his previous appointment to the deanship Gonzalez frankly suggested to the UP board of regents to place him on probation as acting president of the state university, but the board, under Quezon’s chairmanship, voted him permanent president. It was a challenge, and Dr. Gonzalez was equal to it. One year later somebody remarked. The man about whom doubts had been expressed as to his being good enough for the deanship of the College of Agriculture has amply vindicated himself, for he has proved that he is good enough to become president of the University of the Philippines.

A first-rate scientist, Dr. Gonzalez son became a first-rate educator. His life was animated by the same spirit of healthy discontent that impels the researcher in the natural sciences to seek continually ways for betterment. He said education consists of three phases: the imparting of knowledge, the preservation of knowledge, and the acquisition of knowledge. He agreed with President Robert Hutchins of the University of Chicago that the college is where the “student ceases to be taught and begins to learn. Gonzalez would encourage teachers with a natural ability as researchers because they were capable of independent thinking and invaluable in the field of collegiate and university education. In any case, he added, ‘education will have to be progressive if it is to maintain its proper position in the scheme of human activities ... (and) to meet the varying and expanding needs of humanity.

On 13 December 1941, a few days after the start of the Pacific War a widely circulated weekly magazine published President Gonzalez article entitled “After this War, What of the Philippines?” He reiterated that “the root-cause of all modern wars is economic. The basic urge is the natural desire for survival. Therefore, as long as world economy remains unsatisfactory there will always be wars and preparation for war.

There must be something wrong somewhere, he added, when the good earth’s produce is so plentiful in some places that much of it is dumped into the sea while in other places millions of people starve to death. Whatever may be the reason for it, one thing is certain and that is that to the extent man succeeds in balancing production and consumption to that extent he can maintain peace and order. The world in incessantly in a state of flux. It cannot remain static; it is wishful thinking to say that the world will settle down after this war. Nations, like individuals, must struggle or perish.

Whether sovereign or dependent the Philippines in order to survive must develop to the fullest extent her manpower and her natural resources. Leadership must be placed in the hands of those who possess the necessary intellect and the willingness to serve. Merit must be given due recognition in all activities. And in order to strengthen the moral stamina of our people’s our leaders must inculcate in the mind of our youth the highest ideals by precepts as well as by example.

In 1948 President Gonzalez told a faculty conference in Baguio that it was his dream that the graduates of the University of the Philippines, serve as a level to elevate the moral standards of the nation and become like the leaven that ferments the dough. That his dream materialized is a moot question. Postwar politics in the Philippines became a rough-and-tumble, no-holds-barred affair. Each one to himself, and let the devil take the hindmost. His well-conceived plan to transfer the state university to Diliman without delay
was mocked and scoffed. Politicians in high places derided him, but he stood his ground. At last the transfer was affected. Although time vindicated him, the pernicious interference of partisan politics in university affairs would not stop. The powers-that-be wanted to ease him out. A group of distinguished lawyers offered his services to test the validity of such a move. Gonzalez was grateful but he would not go to court. It might lead to misunderstanding. People might consider that he was interested in his position rather than in the principle. Furthermore, he would not want to remain where he was not wanted. When he felt that he was going to get it, said a UP faculty member, Gonzalez did the only honorable thing to do, and that was to resign from his office.

University students rallied behind Gonzalez when they learned of the great political pressure to force his retirement. But to no avail. With a heavy heart Gonzalez left the state university on 22 April 1951. Not long afterwards he was stricken ill. He fought hard against a much dreaded ailment but died as he had lived, defending the principles of freedom under which science can thrive. Death came to him on 30 December 1953 at the San Juan de Dios Hospital.

One More Exemplary Citizen Gone" reads the title of the editorial of an afternoon daily. He was "a man of vision of courage, chimed another Manila daily. He was "an exceptional scientist, one who realized that his value as such could be greatly increased by maintaining close and sympathetic relations with his fellowmen. One senator described him as a man of conviction – was stubborn even, especially when he knew that to be such was to be true to his conscience and to his duty. Senator Jose P. Laurel said the former UP president was not only a Filipino to the core of his bones, but he stands permanently as a man of science without much ambition in life except to contribute to the welfare and happiness of mankind.

It was his second son, Gonzalo, who best summed up his thinking as an educator. He said, The prime aim of a university worthy of the name was, to his mind, not the turning out of more clever lawyers, more skilled physicians, more thorough engineers or more flashing topnotchers. Its true mission is to send forth men and women of integrity; and he knew that the best way to imbue students with integrity was to have teachers who were persons of integrity so that steadfastness of character, loyalty to principle and altruism would, as it were leap like a flame from teacher to students and blaze forever in their hearts. A man can lose all he possess and still live with himself. But if he has lost his integrity, my father said, he lost everything.

One little known accomplishments of Dr. Gonzalez as president of the UP was his having reserved a space for a chapel on the university campus. A Jesuit chaplain said Gonzalez was the first UP president to recognize the importance of religion in the lives of faculty and students, in the life of the university community. Emphasizing the importance of religion, a senator said "life and its pursuits would be meaningless unless such lives and services would be devoted and consecrated to Him. Commenting on the allotment of a space for a chapel, he added. It was not one of his greatest decisions that President Gonzalez had made, but it might well be one of his far-reaching decisions.

Significantly, Gonzalez died on a day of national mourning – December 30th – the day Rizal was executed on Bagumbayan field. It was in a sense, another kind of martyrdom for the former UP president who was dubbed as anew "Don Quixote" for having launched his students on a quest for ideals in a land gone berserk because it had lost much of its sense of values. The Chinese sage, Lao-Tzu. Could not have put it any better.
1. President Gonzalez’ predecessors were 1) Dr. Bartlett, 1911-1915; 2) Ignacio Villamor, 1915-1920; 3) Guy Potter Benton, 1921-1923; 4) Rafael Palma, 1923-1934; and 5) Jorge Bacobo, 1934-1939.


5. Inaugural Program supra.

6. Summary Account of Significant Trips Made by Bienvenido M. Gonzalez 25 July 1914 to 21 December 1941. p. 110, item no. 52. Manuscript is among the “Bienvenido M. Gonzalez papers, deposited in the archives section, Library of the University of the Philippines.


8. The faculty of the Universidad Literaria de Filipinas: faculty of law – Cayetano S. Arellano, Pedro Ocampo, Hipolito Arsenio Cruz Herrera, Felipe G. Calderon, Pedro Ocampo, Hipolito Magasalin Tomas G. del Rosario, and Ignacio Villamor; faculty of medicine and surgery – Joaquin Gonzalez, Trinidad H. Pardo de Tavera, Jose Albert, Salvador V. del Rosario, Francisco Liongson, Ariston Bautista, Isidoro Santos, Justo Lukban, and Jose Luna; faculty of pharmacy – Mariano V. del Rosario, Antonio Luna, Leon Ma. Guerrero, Alejandro Albert, Enrique Perez, Manuel Zamora, and Mariano Ocampo; faculty of notarios public – Aguedo Velarde, Arcadio del Rosario, and Juan Gabriel y Manday. The administration was composed of Joaquin Gonzalez, rector and Mariano Crisostomo y Luga, secretary general, Leon Ma. Guerrero was the second rector of the university, Vide Vicente Coloso, Jr. The first state University, “Philippine Collegian, October 19, 1941.

9. Inaugural Program supra.

10. The UP board of regents was composed of the following: Jorge Bocobo, chairman Jose Gil, Bienvenido M. Gonzalez, Vicente Madrigal, Horace B. Pond, Carlos P. Romulo, Manuel Roxas, Cebedonio Salvador, Vicente Singson Encamacion, Fernando E. V. Sison, and Guillermo Z Villanueva, members.
11. Domingo Abella, The Spanish Mestizo During the Colonial Period: A Preliminary Study. Paper read on the third day of the national celebration of History Week, September 7, 1974 at the exhibition hall of the Bureau of Records management.


15. Pascasio, supra.

16. Uichanco’s article in Philippine Agriculturist, supra.

17. His professor in the department of animal husbandry informed President Glenn Frank of the University of Wisconsin that Gonzalez was one of the two brightest students in the history of the department “ Vide Leopoldo B. Uichanco, Bienvenido M. Gonzalez; NRCP Bulletin No. 39, issues.

18. Ocfemia’s article supra, and Uichanco’s article in Philippine Agriculturist, supra.

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Personal Information:
B. M. Gonzalez professor in animal husbandry informed President Glenn Frank of the University of the Wisconsin, (see notes no. 17).

In terms of concrete achievements in both pure and applied research, Manuel Luz Roxas, the scientist, stood head and shoulders above his contemporaries. His was the marvelous feat of breaking the difficult and awesome dichotomy of science and technology bridging the gap between theory and practice. He was variously dubbed by his own peers as the “outstanding scientist of his generation”, the father of sugar technology and agricultural chemistry in the Philippines”, the father of the national Research Council of the Philippines, the father of Philippine industrialization, and, last but not least, the dreamer of great dreamers” who, fortunately, and the “knack of taking hold of abstruse technical ideas and toning them down to practical down-to-earth application.
Dr. Roxas record is eminently unique for its many “first”. He was the first of three first B.S. in Agriculture graduates from the UP College of Agriculture in Los Baños, Laguna, in 1911; the first Filipino (albeit an undergraduate) to be appointed member of what used to be an all-American faculty of the State college, occupying the position of assistant in mathematics; the first to receive an MS in Agriculture for the same institution in 1913; the first university fellow from Los Baños to specialize abroad 1914-1916; and the first Filipino to obtain a Ph.D. in Agricultural Chemistry from the University of Wisconsin in 1916.

Such was Dr. Roxas academic preparation for what turned out to be a fruitful and distinguished scientific career. From then on he scored many “first” in the more challenging field of applied science. He was the first faculty member to introduce the sugar technology curriculum in his Alma mater shortly after his return from the United States; the first Filipino to become full professor (1924-1927) and head of the department of agricultural chemistry of the state college; the first scientist to make an experimental sugar mill out of the junks and tin cans which to the amazement of his American colleagues, worked well enough to serve the needs of the chemistry laboratory until the college authorities, in recognition of his efforts, appropriated funds for a more permanent equipment.

Although his initial efforts were concentrated on the chemistry of sugar, his insatiable curiosity took him to other fields of research. He was the first to process industrial alcohol from cassava; the first to introduce fertilizer and pesticide in sugar cane culture, and the first to make successful studies in the chemistry of food materials and in the problems of nutrition in the Philippines. He earned the distinction of being the “father of sugar technology and agricultural chemistry in the Philippines” for including such academic studies in the college curricula. His fame as a sugar technologist soon spread far and wide. Consequently, in the Surabaya (Java) conference of 1929 he was the first Filipino and only Malayan to be elected vice-president of the prestigious International Association of Sugar Cane Technologists, which was then dominated by Western scientists.

Doubtless because of his acknowledged preeminence in the field of science, Dr. Roxas was appointed the first director of plant industry in 1930 when the old bureau of agriculture was split into the bureaus of plant industry and animal industry. The latter bureau was, understandably, headed by an American, Dr. Stanton Youngberg, there being no Filipino scientist of similar specialization at the time. Three years later, Dr. Roxas was elected chairman of the national Research Council of the Philippines. In 1935 he was appointed the first Filipino emeritus professor of agricultural chemistry in the U.P. College of Agriculture. In the same year, having retired from government service, he set up the first successful meat packing factory in the Philippines – the Rose packing Co., Inc., which was named after his beloved wife, Rosario (Rose) Kalaw Roxas.

In 1937, in his capacity as presidential adviser and concurrently chief of the technical staff of the National Development company, the mother of government corporations, Dr. Roxas has the rare the Philippines. Indicating the magnitude of his dream and expectation for his privilege to be the first to draft a scientific integrated industrialization program for country, Dr. Roxas program – definitely no picayune stuff – was embodied in 27 huge volumes. Several years later, in 1945, when the question of Japanese reparations to the Philippines was under study, he was asked by Dr. Vicente Sinco, then commissioner on foreign relations, about the program of Philippine industrialization. Dr. Roxas replied that he had prepared a comprehensive program years before the outbreak of the war, but that, to his disgust, those who were to carry it out merely shelved it.
It recognition of his expertise in the field of nutrition and in food canning, Dr. Roxas in 1946 was appointed the first director of the National Food Products Corporation, a subsidiary of the NDC. And to cap his brilliant career as a scientist and technocrat, he was appointed in 1947 chairman of the National Economic Council, the predecessor of the present constitutional body, the national Economic and Development Authority.

The youngest of 18 children of whom only six survived to mature age, Manuel L. Roxas was born to a rich couple, Don Sixto Roxas y Pangilinan, several times capitan municipal of Lipa, Batangas, and Alejandra Luz y Mitra, a pretty heiress of Spanish-Chinese extraction. The day of his birth, 1 July 1887, was a feast day of the Sacred Heart of Jesus. Devout Catholics might attach particular significance to the fact that Manuel was born on such an auspicious day in the religious calendar, but, truth to tell, he was, not pious in the real sense of the word, according to his son, Sixto K. Roxas, president of the Bancom Development Corporation. He was a religious man more in the ethical context.

Manuel was born at a time when the Luz-Roxas family was enjoying the peak of prosperity during the heyday of the coffee industry in the Villa de Lipa, the old Spanish name for the fabulous town of Batangas which for more than seven decades, 1814-1892, the coffee capital of the Philippines, and for at least six months (circa 1886-1888) the world’s sole supplier of coffee beans. Lipa chalked up an annual income of P4,000,000 from coffee alone, according to the eminent Filipino scholar, Teodoro M. Kalaw.

In late 1887, Manuel’s eldest brother, Baldomero, a third year medical student at the University of Santo Tomas, left for Spain to continue his studies. For eight years, 1887-1895, he received a “princely pension” from home, made possible by the substantial family income from the coffee business. Baldomero led a carefree life in Madrid and neglected his studies. He was not aware that in 1888, the year after he left the Philippines, the coffee industry had begun to decline from infestation by a virus known as Bagombong. In the absence of an adequate pest control, the worm brought such havoc that by 1892 the Lipa coffee industry was in utter ruin.

But the Roxas family had managed to save during the boom years, enabling Baldomero to enjoy his huge allowance for the next three years until 1895 when it ceases altogether, forcing him to work his way through college. Finishing his medical studies, he returned to the Philippines in 1897 shortly after the Rizal execution. As the revolution was in full swing, Baldomero, an ilustrado like Rizal, immediately became suspect in the eyes of Spanish authorities.

Manuel, in his Reminiscences, admits that he owed his life to Baldomero. The first “break” he received from his brother was when the latter, attending his mother’s delivery, sucked the clotted blood out of the still-born infant’s nose, thus enabling him (Manuel) to breathe and survive. The second “break” came when the young Manuel was taken by his father to Manila in 1992 and enrolled as a day boarder at the Ateneo Municipal, with Baldomero, then medical officer of the Manila police department, financing his education.

In view of his formal schooling in Lipa before coming to the city, Manuel was at once admitted in the second year of the five-year segunda endenanza at the Ateneo. He lived with his bachelor brother in an entresuelo of a house on Calle San Roque (now Estero Cegado) in Quiapo. Shy and hard of hearing, he stayed at home most of the time, studying his lessons. Although he was reluctant to admit that he had obtained “better
than passing marks, the truth is that during the graduation exercises at the Ateneo in 1906, Manuel was given the distinction of having received sobresaliente en todo (all-around excellence), eliciting the following remark from his tutor: Always have I known that this boy has something in him though he has very seldom shown it.

That the young Manuel had got something in him was, it soon turned out, a clear understatement. Armed with an A.B. degree from the Ateneo, he proceeded to the Normal School in 1907, taking a preparatory course in agriculture. He also wanted to further polish his English, a subject he had taken at the Ateneo under Spanish Jesuit fathers. Apparently he was on his own this time, receiving no more vacation working for then Speaker Sergio Osmeña of the Philippine Assembly as Spanish-English translator and occasionally as a private secretary.

It should be noted that in 1907 the Normal School (now the Philippine Normal College) was the highest institution of learning under the American educational system. The University of the Philippines was inaugurated the following year, 1908. One of his teachers at the Normal School was Dr. Edwin Bingham Copeland who later transferred to Los Baños when the U.P. College of Agriculture was opened in 1909, and became its first dean. A country lad whose interest in agriculture was aroused, the young Roxas followed Dr. Copeland to Los Baños, becoming one of his first students.

With his classical education at the Ateneo and his two-year preparatory training in agriculture at the Normal School, Roxas was indeed well prepared for the rigorous studies at the state agricultural college. In fact, because of his superior training, he was shortly afterwards appointed assistant in mathematics, surveying and chemistry. Furthermore, his advanced academic credits at the Ateneo and Normal School were validated, hence Roxas was able to graduate, after only two years, with a B.S. in Agriculture. His two co-graduates in 1911 were Jose F. Zamora, former president, U.P. College of Agriculture Alumni Association, and a certain Mr. Tempongko. Immediately after graduation he married a townmate, Rosario Kalaw, 15 younger sister of the famous Kalaw brothers (Teodoro and Maximo).

In the same year his first research work entitled “The Pandan Industry in Majayjay,” appeared in the Philippine Agriculturist and Forester. This was soon followed by three other articles in the same journal, namely, “The Cultivation of coconut,” “The Effect of Some Stimulant upon Rice,” and “The coffee Industry in the Island of Luzon.” A prolific writer, these early writings were merely the opening salvos of a tremendous barrage of scientific papers (98 in all) published in various journals, including the Journal of Biological Chemistry, Sugar News, Journal of the Soil Science Society of the Philippines, Philippine Agriculturist, national Research Council of the Philippines Bulletin, Philippine Social Science Review, Bureau of Plant Industry Fortnightly News, The Citizen and other papers.

Not contented with a bachelor’s degree, Manuel continued his studies, obtaining an M.S. in Agriculture in 1913. Although no thesis was required of the first graduates, he nevertheless submitted a paper entitled “Effect of Rare Metals in the soil on Growth and Seed Production of Rice,” which was published the same year in the Philippine Agriculturist. He was also appointed instructor in chemistry. Working and studying at the same time, Roxas proved beyond doubt that he could hold his own among the Americans. And perhaps more, because many years later, in 1930, it was Dr. Copeland’s rare experience and privilege to be appointed by his former student, Dr. Roxas, then director of plant industry, as the first superintendent of the Los Baños Economic Garden, the local counterpart of the famous Buitenzorg technology at the Boston Institute of
After one year he was appointed university fellow in 1914, Roxas left for the United States, taking up advanced study in industrial chemistry and sugar transferred to the University of Wisconsin where he obtained his Ph.D. in Agricultural Chemistry in 1916. His wife, Ose, went along with him, leaving behind their first child, Felicia, in the care of her grandmother. As she, too, wanted to study, Roxas was forced to work, teaching Spanish in a private school, to supplement his allowance as pensionado which was not enough for both of them. Roxas’ doctoral thesis entitled “Formation of Melanin Compounds from Reaction of sugar and Amino Acids,” was published the same year in the Journal of the American Chemical Society. Unfortunately, his reprints of the thesis were used by Japanese soldiers for making fire in the Roxas residence in Lipa during the occupation.

Humble to a fault, Dr. Roxas did not mind resuming his old position as chemistry instructor at the UP college of Agriculture soon after his return from abroad. A Ph.D. holding the position of mere instructor? In the colonial atmosphere prevailing at the time, critics described the degrees of Filipino Ph.D.’s as “a dollar sign on a copper coin. But Dr. Roxas was quick to rise in defense of himself and his colleagues. Not long afterwards his perseverance paid off. He was promoted in rapid succession, to assistant professor, then associate professor, and finally full professor in 1924, at the same time acting as head of the department of agricultural chemistry – a signal distinction for a Filipino among American scientists.

In the highest tradition of scholarship, Dr. Roxas combined teaching and working – translating theory into practice. In 1924 he worked as part-time cane technologist of the Philippine Sugar Association, rising to the position of assistant director of research four years later. In the same year he headed a group of Filipino technologists, under contract with the British-owned Nipa Palm Company, who went to the British North Borneo and successfully demonstrated the feasibility of manufacturing sugar from nipa sap. Not wanting to spend all his life in teaching, Dr. Roxas resigned for the U.P. College of Agriculture in 1928, but the university authorities, taken aback, refused to accept his resignation and allowed him to retire. He continued as research director of the PSA and consultant of the Pampanga Sugar Mills, two positions which gave him a substantial income. In 1929 he represented the PSA in the third Triennial conference of the International Association of Sugar Can Technologists held in Java. He was subsequently elected vice-president of the world association.

By virtue of Act 3639 of January 1, 1930, the old bureau of agriculture was divided into the bureau of plant industry and the bureau of animal industry. Again Dr. Roxas earned the distinction of being the first director of plant industry. His appointment involved a great financial sacrifice because the director’s salary was P5,000.00 less than his income from the PSA and the Pampanga Sugar Mills. But he was one to put material considerations above public interest. A man with a social conscience, he accepted the new position as a challenge to public service.

Dr. Roxas, of course, was no bureaucrat. He was above all, service-oriented. The first big job he tackled as plant industry director was combating the leaf minor infestation of the coconut industry in Laguna, Tayabas, (now Quezon), and Batangas. Given the full backing of his immediate superiors, Secretary Rafael A. Alunan and Undersecretary Jorge B. Vargas, of the department of agriculture and commerce, Dr. Roxas mobilized
the entire personnel of his bureau in a fullscale campaign against the plant pest, bringing it under control after a few weeks.

He was an “achiever” in the true sense of the word. He set up the Los Baños Economic Garden under Dr. Copeland’s supervision, established the Lipa Citrus Experiment Station, thus popularizing modern citrus culture among farmers, launched extensive research work on the utilization of coconut and its by-products, and made successful experiments on abaca which subsequently gave birth to the P50,000.00 burlap industry in Albay. In addition, he held a series of practical demonstration on the canning of pork and beans, and in support of this industry he instructed his extension workers to encourage farmers to grow legumes. In 1930 the plant bureau had eight experiment stations. This number grew to 20 in 1958 with research projects totaling 199, including 47 on rice, 22 on com, and 130 on citrus and other crops. To give his personnel ample latitude in their experiments and research activities, Dr. Roxas transferred the bureau from its original site in Intramuros to the more spacious Singalong Propagation Station.

Dr. Roxas’ numerous projects did not go unnoticed. On 21 March 1933, the U.P. Alumni Association awarded him a gold medal and diploma for achievement in science and research. But the honor had more than passing significance. In the 25-year existence of the state university (1908-1933), Dr. Roxas together with Dr. Cristobal Manalang of the bureau of health, was singled out as the most outstanding from among 6,000 alumni of the university. The two were cited for having “excelled others in their respective fields, conducted wide researches and made valuable contributions to the world of science.

Before the year was over, on the 8th of December, Governorg General Frank Murphy signed Act 4120 creating the National Research council of the Philippines, the highest state advisory body on scientific matters. Dr. Roxas, who headed the committee that prepared the draft of the bill, was elected chairman of the council. For his expertise in organizing the different divisions of the executive committee, he earned the title of “father” of the National Research Council of the Philippines. In 1934 Dr. Roxas a comfortable job in the government, he graciously refused.

Of course, as far as the Batangas scientist was concerned the Roxas administration was not without its lighter side. Because of their identical names, save for their middle initials, he was sometimes mistaken for the President. In July 1946, Dr. Roxas received a letter addressed to him at Malacañang Palace by the New York Academy of Science, advising him that he was still a member of the Academy, and at the same time congratulating him on his election to the presidency of the Philippine Republic.

Even in retirement Dr. Roxas must have been bothered by his conscience whenever he declined offers of job in the government. Why deny his own people the benefit of his knowledge and experience? Finally, in 1946 he accepted the position of director, National Food Products corporation. The following year he also accepted appointment as pilot plant and industrial consultant of the National Coconut corporation. Consequently, he submitted to the NACOCO two important reports, namely, “A comparative Study of the Various Methods of Separating Oil from the Coconut Neat,” And “The Integration of Production in the Philippine coconut Industry,” the latter embracing also the manufacture of wallboard from coconut husks. He likewise served as technical adviser to President Elpidio Quirino. But in germs of significance to national development, Dr. Roxas reached the climax of his public career when he was appointed chairman of the National Economic Council in 1947.
In making a cursory assessment of the life of Dr. Manuel L. Roxas, one cannot fail to perceive a dominant note throughout his adult life. This had to do with what he felt as his paramount mission in life, both as a scientist and as a citizen. One is inclined to believe that like Apolinario Mabini, a fellow Batangueño, Dr. Roxas in his dual role identified his individual interest with the larger and overriding interest of the nation. The patriot Mabini simply could not visualize his personal happiness apart from his country’s happiness. So did scientist Roxas. Both, clearly enough were of the same nationalist mould.

Dr. Roxas, to be more specific, perceived his personal fulfillment in the service of his country – in the task of improving the quality of life of the Filipino people by raising their living standards not by radical methods but by steady and sustained efforts at harnessing, through science and technology, the full potential of the country’s natural and human resources. Briefly, his idea was to modernize agriculture to promote general prosperity and then launch an integrated industrialization program, utilizing mostly local raw materials, until a self-sufficient, vibrant, and independent national economy is achieved. With the Philippines standing firmly on its feet, economically and politically, the opportunity for progress becomes limitless as the horizon. This is the essence of the Filipino dream which one feels. Dr. Roxas must have seen through the powerful binoculars of his intellect as a great scientist.

In the adoption of an industrialization program for the Philippines, Dr. Roxas told the Fourth Philippine Science convention on 23 February 1937. I wish to emphasize the necessity of a thorough scientific consideration of our situation. The tendency is to either copy industrial development in other countries or imitate the products which we are importing from abroad regardless as to whether or not they really are the ones we need or which fit our taste. We should look farther ahead than copying development in other countries.

More progressive countries, he said in 1935 shortly before the inauguration of the Commonwealth government have realized the great value of scientific and technical preparation, both in the improvement of their industries and in meeting critical conditions. We are not taking full advantage of what science can offer in the way of more rapid progress towards improving our farming, our industries, and our health conditions on the eve of a portentous change in our political life.

Dr. Roxas bewailed the inadequate financial support extended to scientific research, warning that unless this sad state was remedied, progress would remain very slow. There is also, he added, among our people an utter lack of understanding of what research work is. We scientists take the layman’s attitude as a challenge and we react by pointing our way to utilitarian objectives thereby placing ourselves susceptible to the pitfalls of preconceived ideas away from a healthy attitude in the search for truth. It is because of this that we find a great deal of amateurishness in the practical research work being conducted in our institutions. He said it was wrong to expect the scientist engaged in fundamental research to be the one to turn his researches into practical results. Admitting that the country had many competent scientists, he nevertheless decried the fact that most of them were handicapped by the heavy burden of office routine and teaching in local colleges and universities.

As a scientist turned economist, Dr. Roxas was rather conservative although he was definitely for breaking away from laissez faire American monopoly capitalism. He believed that the Filipinos were not yet mentally ready for full industrialization which, he explained could be brought about only after establishing a prosperous agriculture. He
advocated full support to certain must industries (manufacture of lime and fertilizers, extraction of industrial alcohol from sugar and cassava, gasoline from coconut oil, manufacture of paper from bagasse, canning of meat and fruits, revival of the home spinning industry utilizing native cotton, etc.) which would strengthen agriculture before going into large scale industrialization.

The condition of the world today, he said in 1939, two years before the outbreak of the Pacific War, will not allow us to develop extensively along industrial lines in the way that Occidental countries and Japan have done. We must adopt a middle course economy, remain largely agricultural, developing some industries whose products will find ready market at home and will not need tariff protection because they can be produced more economically here. If industry had to be develop, he said, it must be geared toward producing more food, the work of feeding the nation being the most important task at that stage of our national life.

Dr. Roxas was doubtless influenced by President Quezon’s social justice program. In the development of our industries, he told the U.P. Rural High School graduates in 1939, we should change the purely capitalize philosophy to one of service combined with sound business practice. A realistic reexamination of the current industrial philosophy needs to be made for us to adopt the principle best suited to our condition. There must be a happy medium between strict capitalism and communism which we can adopt—a system like President Quezon’s Distributive State that will bring prosperity to the largest number of people.

It was no surprise that Dr. Roxas batted for a planned economy. Planning the national economy is a practical question and must be discussed in a practical rather than academic manner, he said. A planned economy would differ according to the ideals of government and the state of development of the nation. It means one thing in Russia, another thing in America, and still another thing in the Philippines. He stressed that in any case the Filipinos must fully realize the great value and absolute necessity of cooperative undertaking.

What were the alternatives left for the Philippines? Dr. Roxas answered the question by suggesting the following courses of action: a) invite foreign capital to develop our resources permitting them to establish experiment stations and bring in men with experience in management of new enterprises, from whom Filipinos might learn in time; b) Filipinos with money might form a big capital and import experienced men from abroad; c) the government could go into the business of developing new industries; d) the government could invest in research and investigation that would establish the fact of whether certain industries would pay here or not.

He explained that the first and second alternatives had been followed here but their implementation was too slow and the results were far from satisfactory. The third alternative, he frankly stated, has been done but it is considered undesirable and the principle that government should be kept out of business if forced on us. The fourth is the only course left to us if we are to established new industries rapidly.

Evidently this was the “most influential group” of his time that Dr. Roxas fought in 1937 when he was preparing an industrialization program for the Philippines. The group, according to another scientist, would keep the Filipinos forever as “hewers of wood and drawers of water. Undaunted Dr. Roxas went ahead and finished the 27-volume
industrialization program, consequently earning for himself the title of “father of Philippine industrialization. While supporting most of the Bell Economic Mission’s recommendations in 1952, especially those concerning the modernization of Philippine agriculture, he bewaile the mission’s opposition to the establishment of government corporation like the NDC. In the final analysis the Bell Mission was only being true to the American policy of leaving economic development to private initiative – a policy which, if adopted in a developing country like the Philippines, would result in economic suicide.

Dr. Roxas garnered many awards and citations, perhaps more than any Filipino scientist of his time. These included the gold medal and diploma awarded by the U.P. Alumni Association for “valuable service to science and country. (1933); the presidential medal of merit for distinguished service in the field of science (1950); the Bureau of Agriculture Golden Jubilee medal of merit (1952); the diploma of merit awarded by the Philippine sugar Technologists for his leadership and inspiration in sugar research and the value of experiments for increasing sugar yield as a powerful factor in reducing cost of production (1953); the National Science week distinguished service medal and diploma for outstanding contribution in sugar technology (1955); the Ateneo golden Jubilee gold medal for being in mind and spirit, a true son of Loyola (1956); the medal of honor awarded by the Chemical Society of the Philippines for distinguished service to the chemical profession (1956); and the degree of doctor of Science, honoris causa, conferred by the Araneta University (1958). The Business Writers’ Association awarded a special citation (posthumous) to Dr. Roxas for outstanding and distinguished contribution to business (1959).

Dr. Roxas was a member of many professional and learned organization, namely, the sigma Xi, Phi Kappa Phi, New York Academy of Science, International Association of Sugar Cane Technologists, Technical Agriculturist Association, American Association for the Advancement of Science (honorary fellow), American Chemical Society, Los Banos Society for Biological Research, soil Science Society of the Philippines, sugar Advisory board, Fiber Standardization Board, and National Research Council of the Philippines.

His name is listed in Who’s Who in America, American Men of Science, and Men of Science in the World.

In 1920 Dr. Roxas wrote a magazine article entitled “For More Filipino Men of Science.” It was quite revealing.

The value of a scientist, he said cannot be measured in terms of pesos and centavos. According to Schiller, two main motives move the world: hunger and love. Even if at times the scientist may barely gratify the former (hunger), the extent to which he can satisfy *(the latter) through love for his work and the satisfaction and happiness he derived from his intimate communion with nature more than compensate for his going hungry. An artist, a painter, a musician, a poet or a novelist may find a great degree of happiness in their respective careers, but they cannot have the satisfaction of a scientist who deals with nature itself rather than with mere imitations of it.

Dr. Roxas was then an assistant professor in his early 30’s. He was beyond doubt an idealist, and his description of a scientist was, unwittingly perhaps, a self-portrait.

Death came to Dr. Roxas on 6 September 1958 at the age of 72. he had just finished experimenting on one more vital project – the preservation of citrus fruits, which are seasonal, making he commodity available all the year round. He was all set to put up a
plant, on a commercial scale when he was stricken ill. A friend, Hilarion G. Henares, Sr., recalled that Dr. Roxas was so obsessed with the project he often asked about it each time he momentarily regained consciousness. He continued giving instruction to his assistants to finish the job. It seemed he would brook no further delay in translating one more dream into reality.

Manuel Luz Roxas remained a true soldier of science to the end. He died with his boots on.

NOTES

1. Part of the citation read during the awarding of the degree of Doctor of Science, honoris causa, by the Araneta University, June 19, 1958.
6. Joaquin Maranon, Dr. Manuel Luz Roxas, eulogy delivered during the necrological services at the Ateneo Law Auditorium, supra.
9. Gonzalez’s article, supra.
10. Paulino J. Garcia, Manuel Luz Roxas eulogy delivered during the necrological services at the Ateneo Law Auditorium, supra.
11. Gonzalez’s article, supra.
12. Manuel Luz Roxas, editorial, Manila times, September 8, 1958, quoting a part of the citation read during the awarding of the Colonel Andres Soriano Award in Chemistry, March 31, 1957.
14. Vicente G. Sinco, Dr. Manuel L. Roxas – An Appreciation, eulogy delivered during the necrological services at Los Baños, supra.
16. Eugenio E. Cruz, Dr. Manuel L. Roxas and the Bureau of Plant Industry, eulogy delivered during the necrological services, September 23, 1958, conference Hall, Bureau of Plant Industry, Manila.
17. Carmelita Roxas, Biography of Dr. Manuel L. Roxas, one of several articles included in the Dr. Manuel L. Roxas Souvenir, July 1, 1934. The book is now in the possession of Mrs. Felicia Roxas Tanco.
19. Sinco eulogy, supra.
20. The six surviving children were Baldomero, noted Manila obstetrician and a complementary of Rizal; Natividad, who died a spinster; Sixto II, former director, Batangas provincial hospital Pacita, wife of Dr. Leon Katigbak;
Brigida, wife of Floberto Arguelles, a pharmacist; and Manuel. Vide Carmelita Roxas article, supra.

23. Ibid.
25. Reminiscences (Ibid) was originally prepared by Dr. Manuel L. Roxas at the behest of his wife Rosario and daughter Carmelita.
26. Ibid.
28. Uichanco eulogy, supra.
29. Jose F. Zamora, Manuel L. Roxas, eulogy delivered during the necrological services at Los Baños, supra.
30. Uichanco eulogy, supra.
31. Cruz's eulogy, supra.
32. Carmelita Roxas article, supra.
33. Uichanco eulogy, supra.
35. Ibid.
36. Carmelita Roxas article, supra.
37. For Public Service, Two Scientists are chosen this year’s Foremost U.P. Alumni, Sunday Tribune Magazine, March 12, 1933, pp. 10 and 18.
38. Interview with Mrs. Felicia Roxas Tanco conducted by Prof. Salazar, July 25, 1974. Mrs. Tanco is the wife of Arturo Tanco Sr., former manager of the NARIC. Aide from Mrs. Tanco the other Roxas daughters are Lourdes, wife of Amado Kalaw, sales manager; NDC textile department; Corazon, wife of Serafin Labrador of the House of Labrador,” Honolulu, Hawaii; Conchita, wife of Apolinario Santos, assistant manager, Rose Packing, co., Inc. Milagros, graduate of the School of Deaf and Blind; and Carmelita, wife of Augusto Natividad. Dr. Roxas has two sons: Sixto, president of the Nacom Development Corporation; and Andres, late husband of the former Chona Tañida. Andres died in a plane crash in May 1970.
39. Carmelita Roxas’ article supra.
41. Sugar News article on Dr. Roxas, supra.
42. Inaugural Address by Dr. Manuel L. Roxas, chairman, National Research Council of the Philippines, No. 19, pp. 56-66 (Date inadvertently omitted).
44. Ibid.
46. Industrialization and Philippine Economy.” Address delivered by Dr. Manuel L. Roxas at the commencement exercises of the UP Rural High School, March 11, 1939, Published in the Philippine Agriculturist, vol. XXVIII, No. 1, pp. 1-4, June 1939.
47. Ibid.
50. Ibid
51. Manuel L. Roxas “For More Filipino Men of Science,” The Citizen
52. Henares eulogy, supra.

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-- The Editor