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The Natural Sciences, 1956-1959

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The Natural Sciences, 1956-1959

PATROCINIO VALENZUELA

THESE notes present a cursory survey of scientific research in the Philippines from 1956 through 1959, continuing previous surveys published in this quarterly.¹

The combined efforts of the Institute of Science and Technology, the National Research Council of the Philippines, the University of the Philippines and the Science Foundation of the Philippines resulted in the passage and approval on 23 August 1956 of Republic Act 1606: "An Act to Promote Scientific, Engineering and Technological Research, Invention and Development." This Act created a National Science Board which provided incentives and financial support for a number of research projects, e.g., pharmaceutical and pharmacological research in Philippine medicinal plants; intensification of certain studies in the field of nutrition, including nutrition surveys; and biological research in antibiotics, tenatus toxoids, human rabies, immune plasma, plasma expanders, plasma fraction and gamma globulins. The National Research Council, with the aid of the Board, also carried on research projects in the physical and mathematical sciences, medicine, agriculture, forestry and engineering.²

¹ Miguel M. Varela, "Scientific Research and Philippine Progress," PHILIPPINE STUDIES II (December 1954), 360-366; Vicente Marasigan, "Science Survey, 1955," *ibid.* IV (March 1956), 83-86.

² Appendices A to H and Summary of Estimates of Research Projects, R.A. 1606 (August 1956), pp. 18-71.

Increased interest on the part of the Administration and Congress resulted in the creation of a Presidential Committee³ to revise Republic Act 1606 in order to further intensify scientific research activities. The Committee was asked to recommend ways and means of coordinating and integrating the total science effort of the country, and promoting the active participation of the private sector in research and the utilization of the findings of research. The results of the Committee's work were embodied in Republic Act 2067: "An Act to Integrate, Coordinate and Intensify Scientific and Technological Research and Development and to Foster Invention; to Provide Funds Therefor; and for Other Purposes." It was approved on 23 January 1958 and is commonly known as the Science Act of 1958.

The National Science Development Board was organized under this Act to take the place of the former National Science Board. Under it was placed as research agencies the National Institute of Science and Technology and the Philippine Atomic Energy Commission. The research projects started under the old National Science Board were continued and new ones were evaluated and given urgently needed financial support.

NSDB-ASSISTED PROJECTS

Among the major projects given assistance by the NSDB during the period covered by this survey are: (1) the establishment of an Institute of Applied Research and Graduate Studies in Engineering at the University of the Philippines; (2) scientific and industrial research under the National Institute of Science and Technology; (3) pharmaceutical and pharmacological research in the College of Pharmacy of the University of the Philippines; (4) the promotion of a greater public consciousness of needs and opportunities in the field of science, under the Science Foundation of the Philippines; (5) agricultural research under the College of Agriculture of the University of the Philippines; (6) nutrition research under the Food and Nutrition Center; (7) public-health studies in the labora-

³ Officially designated as the Science Working Group under the Office of the President of the Philippines.

tories of the Division of Public Health; (8) a total of 23 sub-projects undertaken under the auspices of the National Research Council. A few words on some of these projects may be of interest.

THE COLLEGE OF PHARMACY (U.P.). A research team working on Philippine medicinal plants succeeded in isolating the alkaloidal constituents of Philippine *Rauwolfia*, especially reserpine and rescinamine.⁴ One of the members of this team was granted a UNESCO International Research Fellowship in Germany. In collaboration with Prof. F. von Bruchhausen and Dr. Schafer she succeeded in isolating, purifying and determining the chemical structure of *Pycnarrhena manillensis*.⁵

COLLEGE OF MEDICINE (U.P.). Yams of the family Dioscorea from the Philippines were found to possess a steroidal diosgenin which is used in the synthesis of cortisone and other steroidal hormones and synthetics. Experimental studies on certain Philippine essential and fixed oils were carried out. Pharmacological researchers investigated the effects on blood pressure and respiration and the neuromuscular blocking action of alkaloids from Philippine medical plants. Pharmacodynamic studies in plants with hypergemic activity were also made.

FOOD AND NUTRITION RESEARCH CENTER. This Center intensified its researches on nutrition "for the purpose of gathering enough data and adequate information regarding human and animal food requirements, to be used as guides in the conduct of researchers on agriculture, industry and medicine."

RESEARCH LABORATORIES OF THE DIVISION OF PUBLIC HEALTH. Four distinct subprojects were undertaken, namely, antibiotic research, research on tetanus toxoids, research on

⁴ Rizalina Bernal, Amorita Villegas-Castillo, Ofelia P. Espejo and Alfredo C. Santos, "Isolation of Reserpine and Rescinamine from RAUWOLFIA AMSONIAEFOLIA A.DC." See also EXPERIENTIA, 1959.

⁵ F. v. Bruchhausen, Gertrudes Aguilar-Santos, and C. Schafer, "Über die Alkaloide von *Pycnarrhena manillensis* Vidal. Pycnamine, ein neues Alkaloid der Berbamin-Reihe der Biscoclaurin-Alkaloide." Aus dem Institut für Pharmazeutische Chemie und Lebensmittel Chemie der Technischen Hochschule Braunschweig.

human rabies, and research on mineral plasma and plasma expanders.

NATIONAL RESEARCH COUNCIL OF THE PHILIPPINES. The following subprojects were undertaken:⁶ (1) a survey of marine algae of the Philippines, a cooperative project of the University of the Philippines and the University of Hawaii; (2) biological rat control studies; (3) fruit and vegetable preservation and utilization under the Bureau of Plant Industry; (4) a survey of blood sugar and non-protein nitrogen of normal Filipinos of different ages and ethnic groups, by the College of Medicine, University of the Philippines; (5) marine fisheries research under the Bureau of Fisheries; (6) studies of fourteen thyrotoxic cases who have received radioactive iodine with doses ranging from 4 to 9 millicuries, as part of an "Investigation of the Various Iodinated Proteins in the Blood of Normal Individuals and in Conditions Associated with Disturbed Thyroid Functions," by the UP-PGH Medical Center; (7) studies on the mechanism of liberation of the hyperglycemic factor from the Islets of Langerhans, and the effect of epinephrine administration of minute doses into the pancreatic artery, in the College of Medicine, University of the Philippines; (8) a study of corneal transplantation and corneal diseases in the Philippines, by the College of Medicine, University of the Philippines, and the Philippine General Hospital; (9) studies on drinking water standards for rural areas by the Institute of Hygiene, U.P.; (10) effects of I-Strain on Grignard Reaction of Cycloalkanes, (11) forage and pasture grasses of the Philippines, and (12) studies on plants belonging to the Family Euphorbiaceae, by the College of Liberal Arts, University of the Philippines; (13) utilization of fixed and volatile oils, by the National Institute of Science and Technology; (14) cassava development, and (15) fruit wines, by the Bureau of Plant Industry; and (16) studies on 471 households in Barrio Pinambaran, San Miguel, Bulacan, by the U.P. Statistical Center.

⁶ Progress reports on these subprojects are available at the offices of the National Research Council and the National Science Development Board.

In addition to the general grants-in-aid allocated by the National Science Development Board to the National Research Council of the Philippines, the latter also assisted from its limited research funds the following: (a) eleven new and four old research projects in 1956; (b) fifteen research projects in 1957; (c) seven in 1958; (d) eleven in 1959.

NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY. A total of forty-four (44) research projects were completed by the various centers of the National Institute of Science and Technology during the period of July 16, 1958 to January 30, 1959.⁷ Among the projects of the Institute are the following: (a) industrial, chemical and engineering researches to develop a greater use of local materials; (b) researches in food technology and related fields; (c) studies of micro-organisms which may be used in industrial manufactures and processes; (d) researches in medicine and pharmacology with a view to developing new medicinal and pharmacological uses of local raw materials; (e) scientific studies in agriculture and natural resources with special reference to the industrial utilization of plant and animal by-products, coconut and crop improvement; and (f) establishment and maintenance of consistent standards for testing and analyses of industrial materials and products, including the calibration of weights and measures.

SCIENTIFIC DOCUMENTATION AND LIBRARY REFERENCE SERVICE. The establishment of the scientific documentation and library reference service which is at present operating in the National Institute of Science and Technology has extended very valuable aid to scientific research workers in the Philippines.

PHILIPPINE ATOMIC ENERGY COMMISSION. The PAEC is charged with the formulation of policies affecting nuclear energy and with coordinating government research entities and instrumentalities in the field of science. It completed a study of the gamma-ray shielding properties of some building materials during the period covered by this survey. Its radio-

⁷ Annual Report for the period from July 16, 1958 to June 30, 1959 of the National Science Development Board.

active-iodine studies in various thyroid disorders among Filipinos⁸ attracted the interest of the International Atomic Energy Agency.

RICE AND CORN. Research on rice and corn has been one of the major projects of the College of Agriculture, University of the Philippines. The National Science Development Board extended assistance to its studies on rice culture.

The results of scientific research on rice and corn are mainly to be found in the publications of this College and those of the Department of Agriculture and Natural Resources. Improved cultural methods, fertility research, studies on plant pests and disease control, irrigation, drying, storage and aeration, to mention only a few, are among the research projects that were given preferential attention.

VIRUS RESEARCH. This project, assisted by the National Science Development Board, was and is being undertaken by the Bureau of Plant Industry. It includes surveys and studies of virus diseases of our major crops insofar as the nature and classification of the virus and effective methods of control are concerned.

CADANG-CADANG RESEARCH. Research work on cadang-cadang was undertaken and is being continued by a research committee under the sponsorship of the National Science Development Board. The participating agencies are the College of Agriculture of the University of the Philippines, the Bureau of Plant Industry, and the Philippine Coconut Administration. The work involved studies in virology as well as plant physiology and plant pathology. The researchers reported that "there are evidences that *cadang-cadang* could be caused by copper

⁸ Presented to the Second United Nations International Conference on the Peaceful Uses of Atomic Energy, Geneva, 1-13 September 1958, by P. C. Campos, A. D. Litonjua, E. G. Horilleno, I. Lawes, V. Manipol and B. Baltazar.

deficiency in the soil"⁹ and that "the iron content of the opened leaves might indicate some relation to the health of the palm."¹⁰

UNIVERSITY OF THE PHILIPPINES NATURAL SCIENCE RESEARCH CENTER. Cholesterol studies at this Center came up with the following conclusions:

The serum cholesterol levels of 403 enlisted men, averaging 30 years old, were found to vary from 73 to 353 mg. per 100 ml., with a mean of 171 plus or minus 35 (S.D.)...

The dietary survey showed that in 19 mess halls, fat supplied a mean of 13.9 per cent of the total daily calories which average 3068 per capita. An associated increase in serum cholesterol of 0.812 mg. per cent per year of age was found to be significant at the 1 per cent level. Other physical and biochemical characteristics that were found to be significantly associated with serum cholesterol are diastolic blood pressure in the order of 0.627 mg. per cent per mm. Hg; relative body weight: 0.553 mg. per cent per 1 per cent standard weight; arm skinfold thickness: 2.276 mg. per cent per mm.; scapular skinfold thickness: 1.094 mg. per cent per mm.; and serum carotene: 0.420 mg. per cent per microgram per cent.

No correlation between serum cholesterol and systolic pressure, serum vitamin A and hemoglobin levels was found.¹¹

The research paper on "Serum Total Cholesterol Values in Men of the Armed Forces of the Philippines" was published in the AMERICAN JOURNAL OF CLINICAL NUTRITION, 7 Nov. to Dec. 1959, 702-710.

The Biochemistry Laboratory also made extensive surveys of serum sodium and potassium values of "normal" Filipinos of different age groups; of the sodium and potassium content of normal human hearts; and of serum total cholesterol and phospholipid levels and the cholesterol.¹²

⁹ J. R. Velasco, "Copper Deficiency in Bicol Soil as a Possible Cause of the Cadang-Cadang of the Coconut," PHILIPPINE AGRICULTURIST 41 (August 1957), 157-170.

¹⁰ L. A. Ynalvez, R. R. Covar and G. O. Ocfemia, "Chemical Analyses of Cadang-Cadang," *ibid.* 41 (February 1958), 491-494.

¹¹ Solita F. Camara-Besa in JOURNAL OF THE PHILIPPINE MEDICAL ASSOCIATION 35 (March 1959), 139-152.

¹² Solita F. Camara-Besa, "Report on Scientific Research to the University of the Philippines Natural Science Research Center, 1959-1960." See also ACTA MEDICA PHILIPPINA 15/1, 51-63.

Protein-bound iodine studies in Filipinos were completed during the period covered by the survey.¹³

The results of studies on "Parallel Ultramicro- and Macro-Determinations of Blood Sugar" appeared in the ACTA MEDICA PHILIPPINA.¹⁴

A paper on "The Control of Vascularisation in Corneal Grafts I-Beta Irradiation" was also published in the ACTA.¹⁵

The BOTANICAL GAZETTE¹⁶ published a paper on "X-Ray Induced Reciprocal Translocations and Chlorophyll Mutations in Rice" which contains the results of the work undertaken in the College of Liberal Arts Experimental Garden, University of the Philippines.

The JOURNAL OF PARASITOLOGY¹⁷ published a paper on "Studies on the Family Bucephalidae Poche 1907 (Trematoda) from Philippine Food Fishes," and another on "Transversotrema Laurei, A New Trematoda of Philippine Fish (Digenea: transversotrematida)"¹⁸

Another paper on parasitology dealing with "*Azygia pristipomai* Tubangui, the Genus *Azygia* and Related Genera (Digenea: azygiidae)" was printed in the Proceedings of the Helminthological Society of Washington.¹⁹

There are many other research projects being undertaken under the auspices of the University of the Philippines Natural Science Research Center. Those mentioned here are either already published in scientific and technical journals or are the subjects of more or less extensive progress reports.

¹³ Reports (in manuscript) have been submitted to the University of the Philippines Natural Science Research Center.

¹⁴ Delfin P. Samson and Rosita T. Agarao in ACTA MEDICA PHILIPPINA 13/1-4 (July 1956 to June 1957).

¹⁵ Geminiano de Ocampo and Romeo R. Espiritu, *ibid.* 14 (July-September 1957).

¹⁶ 120/3 (March 1959), 162-165, by Joventino D. Soriano.

¹⁷ 45 (April 1959), 135-147, by Carmen C. Velasquez.

¹⁸ 44 (August 1958), 449-451, by the same author.

¹⁹ 25 (July 1958), 91-94, by the same author.

COMMISSION ON VOLCANOLOGY. There was no volcanic tremor recorded by the seismograph since its installation on the slopes of Canlaon Volcano in May 31, 1956. The instrument is a portable one of the Ishimoto type, one of the three seismographs newly acquired from Japan by the Commission on Volcanology. It has a magnification of 400 and thus is capable of recording tremors too slight or weak to be felt by those living in the vicinity of the volcano.

Constant visual and instrumental observation has been carried out by a volcanological observer from the temporary volcano station in the town of Canlaon, Negros Oriental²⁰.

Seismograph recordings and other observations, chemical analyses of rock, water and ash samples, petrographic studies of thin rock sections, magnetic surveys, geological, geophysical and strictly volcanological investigations were made by the Commission on Volcanology as parts of the studies of Taal, Mayon, Hibok-Hibok, Buluan and Apo volcanoes.²¹ Ocular investigations were also made of Didicas Volcano.

INTERNATIONAL GEOPHYSICAL YEAR (IGY)

The Philippines participated in eight out of twelve disciplines involved in the observance of IGY: (a) meteorology, through the Weather Bureau; (b) geomagnetism, through the Bureau of Coast and Geodetic Survey; (c) ionospheric physics, through the Manila Observatory at Baguio City; (d) solar activity, through Mr. Hans Arber, the Astronomical Observatory of the Weather Bureau and the Manila Observatory; (e) longitudes and latitudes, through the Astronomical Observatory; (f) oceanography, through the Bureau of Coast and Geodetic Survey; (g) rockets and satellites, visual tracking of the artificial satellites; (h) seismology, through the Manila Observatory and the Geophysical Division of the Weather Bureau.

²⁰ Report by the Commission on Volcanology on the Present Activity of Canlaon Volcano, p. 3.

²¹ See the annual reports of the Commission on Volcanology and those of the National Research Council of the Philippines.

Among the contributions were the gathering of meteorological data from selected land stations together with solar radiation measurements from Zamboanga and Quezon Cities. Geomagnetic measurements were made in the Multiple Magnetic Observatory. The Manila Observatory at Baguio City conducted special studies on ionospheric variations and characteristics and took ionograms daily during the IGY period. Photographs of the solar disc were taken at 7:00 o'clock every day and the number, position and growth of sunspots were evaluated. Attention was also given to solar flares and calcium plages. According to the report of the IGY Committee in the Philippines "participation by the Philippines in this activity was hailed and praised by IGY officials, not only because the Philippines in so doing provided a vital link in the round-the-clock observations of the solar disc but also for excellent photographs obtained. A number of points in the Philippines were fixed in the study of longitudes and latitudes and tied with those determined in various parts of the world." Tide, temperature and salinity measurements were made from five regular stations in the oceanographic phase of the work. Regular recording of earthquakes, and microseisms were studied as to their relationship to ocean storms.

AGRICULTURAL RESEARCH

The laboratories of the different departments of the College of Agriculture, University of the Philippines, and of the Central Experimental Station, center of agricultural research, have produced excellent results in their experimental research carried out in the laboratories as well as in the field. The subjects covered are too extensive to be enumerated even cursorily in a survey of this sort.

The other seats of agricultural research are the various units of the Department of Agriculture and Natural Resources.

FOREST PRODUCTS RESEARCH INSTITUTE

Glued laminated construction, timber testing, subterranean termites and their control, machining properties of Philippine

woods, production of paper from local materials, wood and forest products utilization, standardized pulping, charcoal and briquetting, are among the research works undertaken in the Forest Products Research Institute.

OTHER SCIENTIFIC RESEARCH ACTIVITIES

The foregoing survey does not include all the scientific research activities accomplished during the years 1956 through 1959. There are others found in various annual reports. Individual scientific and technical research papers were also published in scientific and technical journals issued in the Philippines during the period.