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Science in the Philippines I:
Organization of Science

27 Lugard Road,
The Peak, Hong Kong.

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Mr. R.H. Nolte,
Institute of Current World Affairs,
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New York 17, N.Y..

Dear Dick,

In one breathless hour shortly after our arrival in Manila, Brenda and I were briefed on the status of science in the Philippines. The briefing was so comprehensive and, as it turned out, so accurate, that we might almost as well have turned around and come straight back to Hong Kong. Our "briefing officer" was a young Filipino woman, Miss Josefina Constantino, Assistant to the President of the National Development Bank of the Philippines. Later we were to meet other people like Miss Constantino, young, brilliant, well educated, keenly aware of the problems of their Country, and full of constructive ideas -- and giving confidence in the future of their Country because many hold positions of great responsibility.

During a hectic two and a half weeks I talked to many scientists and administrators, Filipino and foreign, and collected a vast amount of information about the status of science in the Philippines. My task was made easier by the fact that we arrived in time for the annual National Science and Technology Week, which this year was devoted to "The Role of Science and Technology in the Socio-Economic Development of the Philippines". Many Filipino scientists had gathered in Manila to discuss just those things in which I was most interested.

In compiling the factual material I decided to follow the outline guide for reports on the organization of scientific research distributed by the Committee for Scientific Research of OECD. This should make it easier to compare the Philippines with other OECD countries and with others I am able to visit in Asia. Originally, I had intended to compile this for my own benefit, but since the data are collected from a number of government reports, some of which are not generally available, I decided to depart from normal newsletter procedure and submit it as a separate report. In a subsequent letter I will select some of the points of more general interest and discuss these in more detail.

Yours sincerely,

Geoff. Oldham

C.H.G. Oldham.

THE ORGANIZATION OF SCIENTIFIC RESEARCH IN THE PHILIPPINES

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Compiled by C.H.G. Oldham
December, 1963

1. INTRODUCTION

The Philippine Islands are made up of 7,100 islands, although only 462 of these exceed 1 square mile in area. The population of approximately 28 million (density 236/square mile) is mostly concentrated on the three largest island groups of Luzon, Mindanao, and Visayas. 83% of the people are Roman Catholics. About 60% of the working population is engaged in agriculture, with rice, Manila hemp, copra, sugar cane, maize, and tobacco, as the main crops. There is a large production of timber, and logs rank as the third chief export commodity(after sugar and copra). Copper, iron, and chromite ores are also exported. In 1960 the Gross National Product was ₱11.988 billion (U.S.$3.14 billion) and its per capita income ₱370 (about U.S. $100).

The Islands have a long history of Malayan settlement, but were first discovered by a Western explorer, Magellan, in 1521, and came under Spanish rule in 1565. They were ceded to America in 1898 after the Spanish American War, and became independent in July, 1946. Their government structure has similarities with the American government structure, but also some fundamental differences. The President and Vice-President are elected for four year terms. The Congress is made up of a 24 member Senate and a 104 member House of Representatives. The President is assisted by 11 departmental secretaries plus 9 others of cabinet rank who include the Chairman of the National Economic Council and the Chairman of the National Science Development Board.

The Spanish times in the Philippines are more noted for things spiritual than things scientific, although even then there were individual scientists of considerable renown. As early as 1780 there were some people who appreciated the value of science in economic development. In that year the "Real Sociedad Economica de los Amigas del Pais" was founded. It published technical memoirs on coffee and clays, and offered a prize for successful experiments with dyes. But apparently the society generated little support or interest. In the 1860's the Spanish government provided an annual grant to the Manila Observatory and this marks the beginning of government support for science in the Philippines. It is interesting to note that the martyred national hero, Jose Rizal who was killed in 1896, was a scientist.

It was not until the American occupation that science was seriously brought to bear on the problems of the State. The Bureau of Government Laboratories was established in 1901, became the Bureau of Science in 1905 and appears to have had great prestige during its early years. (It would be extremely interesting to study the history of this organization in more detail since its creation followed a period in the late 19th Century when the (unsuccessful) efforts to form a Department of Science in Washington were hotly debated in the United States). In the 1930's the Bureau was departmentalized and never seemed to be quite so effective

as in its early days. In 1933 a National Research Council was organized.

After the War, in 1947, the old Bureau of Science became the Institute of Science under the office of the President. In 1951 this was changed to the Institute of Science and Technology under the office of Economic Co-ordination, and in 1958 changed again to the National Institute of Science and Technology under the National Science and Development Board.

Earlier, in 1952, the Science Foundation of the Philippines was set up to promote research out of private grants and donations. In 1956 the Congress established the National Science Board, but in 1958 Philippine science was officially reorganized (by the Science Act) and the National Science Development Board was formed.

An organization chart is shown in Appendix 1. The National Science Development Board is the chief scientific policy making group in the Country. Its Chairman holds cabinet rank. The governing Board is composed of a Chairman, a Vice-Chairman who is currently the Executive Director of the Board; the Chairman of the National Research Council; the Commissioner of the National Institute of Science and Technology (NIST); the Commissioner of the Philippine Atomic Energy Commission(PAEC); the Director of the Office of National Planning of the National Economic Council; a representative of the University of the Philippines designated by the President of the University; one member representing private industry; one member representing scientific and technological societies; one member representing agriculture; and one member representing education.

The Chairman, and Vice-Chairman are appointed for a six year term by the President, who also appoints the Commissioners of NIST and PAEC on the recommendation of the Chairman of the Board. The members representing private industry, scientific and technological societies, agriculture, and education, are also appointed by the President from among those who are recommended by representative groups. They hold office for three years.

2. MECHANISM FOR THE NATION'S SCIENCE POLICY

The NSDB formulates the national science policy in a four-stage operation: inventory; assessment; programming; and strategy. In the inventory stage, information about the national science resources is systematically collected, compiled and analysed. This activity includes a survey of the research and development activities of both the Government and private sectors; surveys of facilities for science education in institutions of higher learning; studies on status of and trends in research in the major disciplines of science; surveys and studies of production and utilization of scientific and technological manpower. The inventory work also includes relevant foreign material. For example, the experience

of other countries in the formulation of policies is studied. Also the technological developments abroad which could be adapted locally, and the sources of possible technical assistance are noted.

The second, or assessment stage then follows. The NSDB has scientists on its staff to cover specific fields of scientific research: industry, agriculture and natural resources; food and nutrition, biological research, atomic energy, medicine and allied sciences, engineering, the social sciences, etc.. It is the responsibility of these scientists to assess the information in their respective areas and identify trends, and then make decisions on the desirability of changes or shifts in the trends. The scientists are aided by consultations with fellow scientists and by meetings and seminars.

After trends of the science effort have been identified and the gaps to be filled have been determined, then follows the programming of activities. This programming is related to the Government's Five Year Integrated Socio-Economic Program for the Philippines. In fact it is the job of NSDB to gear the scientific activities of the country towards the achievement of the goals of this program. It is at this stage that decisions must be made on such questions as:- Should priority be given to support research or to manpower development? Of the research to be done, how much support should be given for basic research and how much for applied? Of the applied research, which should receive most support, industrial research, agricultural research, or medical research? Decisions are then made on the over-all objectives of the science program and a preliminary plan of action is arrived at by comparing the projected trends of science development and the desired scheme of priority actions.

The next task is the choice of a strategy. This involves the formulation of specific allocations of resources and includes the drafting of measures to provide incentives for the private sector.

The result of all these activities is a statement of an objective, and a plan of action to reach this objective. These constitute a policy, and are incorporated in the NSDB Five Year Science and Technology Development Program.

The policy is implemented by researches carried out by the various research centers of the NIST and PAEC, other Government agencies and by grants to the private sector, including universities.

3. GOVERNMENT RESPONSIBILITY FOR RESEARCH

A list of the principle Government agencies performing research work is listed as Appendix 2. In the Fiscal Year 1960 these agencies accounted for almost all of the ₱12.1 million (U.S. $3.18 million) spent by the Government on research and development. Of this the Department of Agriculture and Natural Resources

accounted for ₱6.2 million (U.S.$1.63 million) and the NSDB for P3.5 million (U.S.$.92 million). 88% of the total went for applied research and development, 12% for basic research. The social sciences accounted for almost half of the total spent in basic research, the life sciences received about 40% and the physical sciences only 12%. In applied research the funds were divided as follows: Agriculture 57%, Economic Research 13%, Industrial Research 14%, Medical Research 11%, others 5%.

The total Government personnel employed in research and development during Fiscal Year 1960 was 970 scientists and engineers, plus 1,420 supporting personnel.

4. CENTRAL BODIES FOR SCIENTIFIC RESEARCH

i) National Research Council. As of December 1960 the NRC had a total membership of 546. The members were divided into eight divisions according to academic field. When first established in 1933 the NRC had the functions to stimulate research, to formulate comprehensive plans for research, and of co-operation and co-ordination. Now most of these functions have been transferred to the NSDB, leaving the NRC free to pursue basic research. It is also the official science advisor to the Government, and represents the Philippines in non-governmental international scientific activities.

ii) Science Foundation of the Philippines. This organization was founded in 1952. Its activities are mainly dedicated to laying the foundations for future research rather than financing research itself. For example it has done much to promote science consciousness in the Philippines, it publishes the Science Bulletin and Science for Schools, it has sponsored science teacher training, educational television, and helped to establish (sofar only on paper) the Philippine Science High School.

iii) The Philippine Academy of Sciences and Humanities. The Academy was founded in 1961 on the initiative of the NSDB. It will have a maximum membership of 40. Of these, 20 will be in the Natural Sciences, and 20 in the Humanities and Social Sciences. There are now 16 members. Its constitution is based on those of other national academies, particularly that in America. It was established to accord recognition and honor to those who have made major contributions in science and humanities towards the country's national ambitions. It does not organize or co-ordinate research, but its members hold meetings and read papers.

5. UNIVERSITY ESTABLISHMENTS

In order to qualify for the title of university, an institute of higher education must conduct research. But although there are 25 such institutions in the Philippines, there is very little research work undertaken. There are two or three universities, such as the State-owned University of the Philippines, and

the Atteneo de Manila, which are exceptions. The University of the Philippines is particularly noted for the research work done by the College of Agriculture at Los Banos, and the College of Medicine. The Atteneo is noted for the Manila Observatory which is located on its campus at Loyola Heights. The Observatory is run by Jesuit priests who carry out basic research in geophysics.

6. RESEARCH PERFORMED BY INDUSTRY

The private sector spent ₱7.71 million in 1960, of which 90% was for applied and 10% for basic research. The non-manufacturing industrial group spent most, ₱2.4 million, of which the communication industry spent ₱2.3 million. The food industry ranked second, and rubber third. Appendix 3 lists expenditures by industry.

An NSDB survey also showed that in 1960, 312 scientists and engineers were employed by industry on research and development work. They were assisted by 766 supporting personnel. 20% of these scientists were employed by the chemical industry, and 17% by the food industry.

There are no research associations for co-operative research, but many of the larger companies are subsidiaries of foreign companies. They are able to benefit from research done by the parent organizations.

7. PRIVATE INSTITUTES FOR SPONSORED RESEARCH

The International Rice Research Institute was inaugerated on February 7, 1962, at Los Banos, about 75 kilometres from Manila. It is a joint Rockefeller Foundation/Ford Foundation project. Ford provided U.S. $7,150,000 for the initial installations and Rockefeller provides for the recurring expenses. It is staffed by an international team of experts. Its mission is to conduct research on the rice plant and all phases of its production; to give advanced training to promising scientists from South East Asia through a resident training program (it received an additional $750,000 for three years for this purpose from the Ford Foundation); to publish and disseminate throughout the world the research findings and recommendations of the Institute; and to organize conferences to discuss problems of rice improvement.

8. DISSEMINATION OF RESEARCH RESULTS AND SCIENCE INFORMATION

The Division of Documentation of the National Institute of Science and Technology is the direct successor to the pre-War Division of Scientific Library of the Bureau of Science. This pre-War library had a fine collection of scientific books and was regarded as one of the best scientific libraries in the Far East. It was completely destroyed during the War. In 1958 the present Division was formed and with UNESCO assistance it became both a library and documentation center, with the added mission of

disseminating scientific information. The Division issues four publications: (1) Philippine Abstracts; (2) Philippine Series of Specialized Collections of Abstracts; (3) Series of Philippine Scientific Bibliographies; (4) Philippine Technical Information Sheets.

In addition the NSDB has a Science Pavilion and Planetarium which have facilities for conferences and lectures. There is an annual science and technology week which includes conferences, exhibits, lectures, film showings and meetings of scientific societies.

The NSDB also publishes the following journals:-
Philippine Journal of Science, published quarterly. Contains most of the original works of Filipinos.
Science Review, a monthly publication devoted to opinions, observations, and news on science and technology, education, and public policies.
Science Bulletin, a quarterly publication issued by the Science Foundation of the Philippines, mainly for high school and elementary school teachers.

In order to disseminate scientific information and the latest research results to the towns and villages, science information offices have been established by the NSDB in several strategic locations throughout the Country.

Several scientific societies play their part in the dissemination of scientific results. The most active are the Societies of Biology, Chemistry, and the Society for the Advancement of Science.

9. INTERNATIONAL SCIENTIFIC RELATIONS

The National Research Council is the body which represents the Philippines in non-Governmental international scientific relations. It is the adhering body to the International Council of Scientific Unions (ICSU), but in fact the Philippines is only affiliated with one of the fifteen member unions, namely the International Union of Geodesy and Geophysics.

The Department of Foreign Affairs handles international scientific relations with Governmental organizations, such as the U.N. and its specialized agencies, although the NSDB has an Office of International Science Relations which arranges visits, conferences and congresses between scientists from foreign countries in the Philippines.

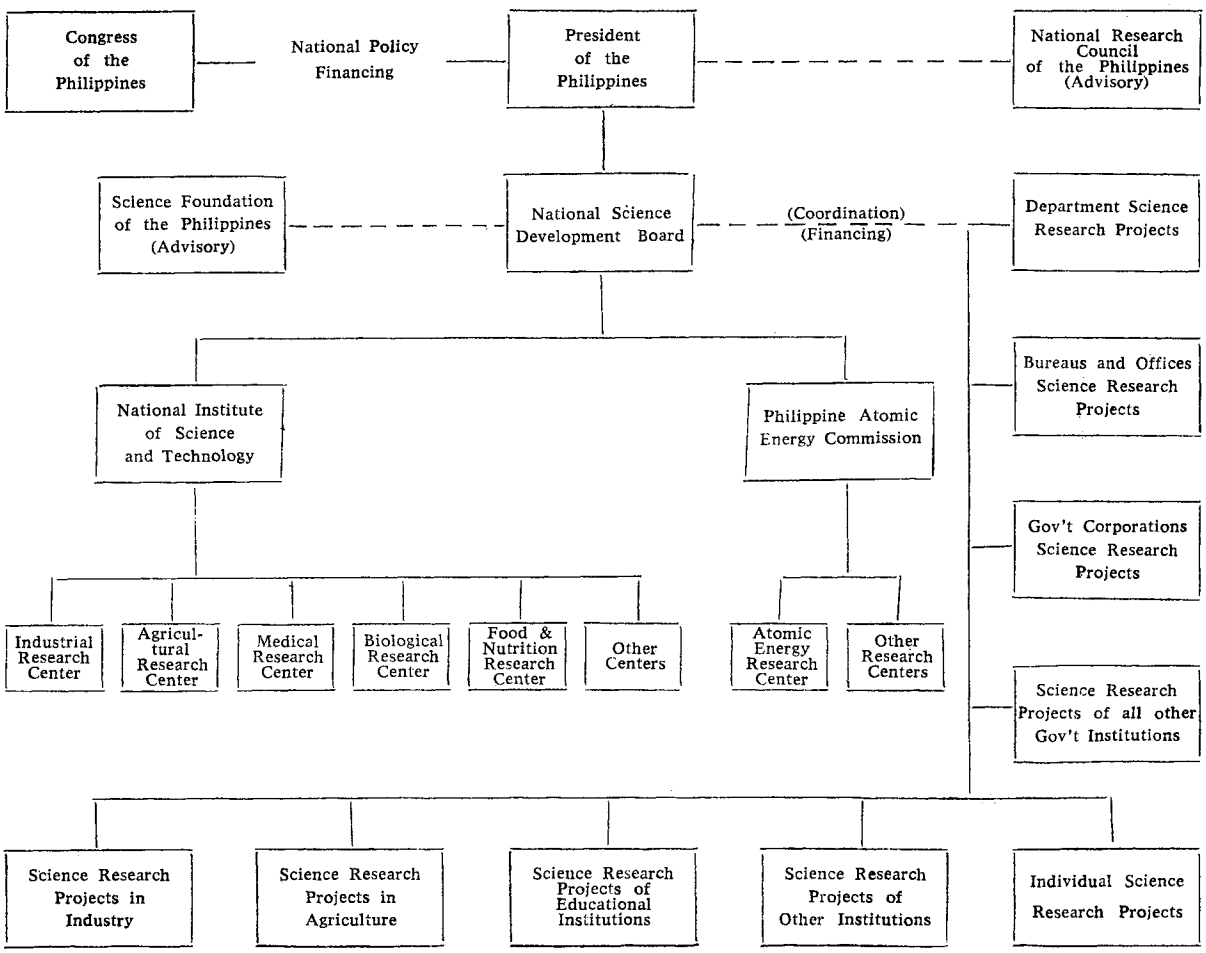
Science Attaches are stationed in Washington D.C., and Bonn, with three more posts to be established.

The NSDB co-ordinates technical assistance and co-operation programs.

APPENDIX 1

NATIONAL SCIENCE DEVELOPMENT BOARD

ORGANIZATIONAL CHART



APPENDIX 2

GOVERNMENTAL RESEARCH INSTITUTIONS

1. Department of Agriculture and Natural Resources
   - Agricultural Economics Divion
   - Bureau of Fisheries
   - Bureau of Forestry
   - Bureau of Mines
   - Bureau of Plant Industry
   - Bureau of Animal Industry
   - Bureau of Soils
   - Philippine Sugar Institute
   - Philippine Tobacco Administration

2. Department of Education
   - Institute of National Language
   - National Museum

3. Department of Health
   - Bureau of Disease Control
   - Bureau of Research Laboratories

4. Department of National Defense
   - General Headquarters
   - Bureau of Coast and Geodetic Survey

5. Department of Public Works and Communications
   - Bureau of Public Highways
   - Irrigation Service Unit

Appendix 2 - continued.

6. Government Owned or Controlled Corporations

National Development Company

Government Service Insurance System

Central Bank of the Philippines

People's Homesite and Housing Corporation

Cebu Portland Cement Company

7. National Science Development Board

National Institute of Science and Technology

Philippine Atomic Energy Commission

8. Office of the President

Land Tenure Administration

9. Department of Justice

National Bureau of Investigation

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APPENDIX 3

RESEARCH AND DEVELOPMENT EXPENDITURES IN PRIVATE INDUSTRY BY INDUSTRY GROUP AND BY CHARACTER OF WORK, 1960

(Peso amounts in thousands)

Industry Group	Total	Basic Research	Applied Research & Development
TOTAL	₱7,712	₱750	₱6,926
Food and kindred products	1,318	437	881
Beverages	32	-	32
Textiles	39	2	37
Wood and cork products	308	169	139
Paper and paper products	73	-	73
Leather	31	-	31
Rubber products	1,229	4	1,225
Chemicals and chemical products	845	45	765
Non-metallic mineral products	220	-	220
Metal products except machinery and transport equipment	69	23	46
Machinery except electrical	223	21	202
Electrical equipment	744	21	723
Transport equipment	48	-	48
Other manufacturing industries	86	5	81
Non-manufacturing industries	2,450	23	2,424

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