DISCUSSION

THE WAR AND SCIENCE IN THE PHILIPPINES[1]

BEFORE the war, most of the modern sciences had attained a considerable degree of advancement in the Philippine Islands. The seats of much of the progress in the various fields were located in the Bureau of Science, certain other governmental branches and the University of the Philippines. These organizations, largely instituted by Americans a few decades ago, had in recent years become almost completely staffed and controlled by Filipinos. Excellent work was being done by specialists in many fields. The *Philippine Journal of Science,* one of the foremost scientific publications in Asia, was published by the Bureau of Science. Many American biologists, well known in connection with their scientific work in the Orient, among them E. D. Merrill, A. W. Herre, E. B. Copeland and the late R. C. McGregor, contributed to the building up of this journal, and the high standards were maintained by their Filipino successors.

The effect of World War II on these institutions is very depressing. The Japanese occupation seriously slowed down work and interfered with the financing of the various institutions. The Japanese army sent the well-known Japanese zoologist, Professor Hatai, of Sendai Imperial University, to Manila, with the rank of major-general, to supervise scientific work. In the summer of 1944, one number of the *Philippine Journal of Science* was published, the first since the September number of 1941. It contained articles by local specialists, and did not include any of the articles by Americans which were on hand or in press at the commencement of the war. Among the latter were articles by Copeland, Alexander, Gressitt and others.

When the American forces approached Manila at the beginning of 1945, the Japanese systematically destroyed the Bureau of Science, the Philippine National Museum and the University of the Philippines, all located at or near Taft Avenue and Herran Street. All the buildings were fired and only a single room escaped burning. This was a room in which some of the older publications of the Bureau of Science, mostly special publications and ten-year indices of the *Philippine Journal of Science,* were stored. Nearly all the stock of back numbers of the journal was destroyed. Some of the more recent ones, not yet inventoried, may still be at the Bureau of Printing, which is in another part of Manila and was not burned. Two of the three buildings of the Bureau of Science collapsed, and the third was gutted but may be repaired. The library and collections were completely destroyed, the latter including many type specimens, particularly of helminths. Several of the university buildings were completely destroyed. One burned-out building adjacent to the Bureau of Science is now being used as administration building and also for classes. The Philippine General Hospital buildings are for the most part standing, and are being used both as hospital and medical college.

The College of Agriculture of the University of the Philippines, at Los Baños, was partly used by the Japanese as a civilian internment camp for Americans. During or before the American liberation, some of the buildings were damaged, and practically all the equipment, collections, library and animals were destroyed. Much of the more permanent experimental plantings were preserved. Two of the buildings are now being used for administration and classes, and some of the others are still occupied by American Army units. Dr. Uichanco, the dean of the college and the best-known Filipino entomologist, was tortured by the Japanese in connection with his aid to Filipino guerrillas and American civilian internees. His shoulder was dislocated and he was hospitalized for over five months. On another occasion, he narrowly escaped a massacre. He is now back at his job.

Of approximately fifty specialists in the Bureau of Science and related governmental organizations, about one half have returned to their work, even though they are without equipment. Some of the others are working temporarily at other jobs. Dr. H. A. Roxas, zoologist, died a natural death during the war, and the following five were killed by the Japanese or died as a result of the war: Dr. C. M. Africa, parasitologist of the Institute of Hygiene; Dr. Lamberta Leiva, retired parasitologist; Dr. Miguel Manresa, of the Animal Husbandry Department of the College of Agriculture; Dr. S. Del Mundo, chemist of the Bureau of Science; and Dr. Jose B. Juliano, a botanist of the Natural History Museum.

Dr. Rafael H. Aguilar, chemical engineer, is temporarily acting as officer in charge of the Bureau of Science. The former director, Dr. Angel S. Arguelles, is not now with the bureau. Dr. Augustus P. West, an American, head of the Division of Organic Chemistry of the Bureau of Science, has returned to America after release from Japanese internment. The following specialists are among those at present with the Bureau of Science: Dr. Eduardo Quisumbing, head,

[1] The Bureau of Medicine and Surgery of the Navy does not necessarily endorse the views set forth in this paper.

Division of Botany, and also head of the Natural History Museum of the Department of Agriculture and Commerce and editor of the *Philippine Journal of Science;* Dr. M. A. Tubangui, parasitologist and head of Division of Microbiology; Dr. Mariano Basaca, bacteriologist; Dr. Joaquin Marañon, chemist, head of Division of Tests and Standards; Mr. Rafael Simpao, chemist; Mr. A. O. Cruz, chemist; Mr. Gil Opiana, ceramics; and Mr. F. D. Maramba, engineer.

In the Department of Agriculture and Commerce, Dr. Deogracias V. Villadolid, ichthyologist, is head of the Division of Fisheries, and Dr. Marcos M. Alicante, soil chemist, is head of the Division of Soil Survey. Others in the Natural History Museum, under the same department, include Dr. Canuto G. Manuel, ornithologist, and Mr. Jose Mendoza, mycologist.

Among the professors at the College of Agriculture of the University of the Philippines at Los Baños are the following: Dr. Leopoldo B. Uichanco, dean and head, Department of Entomology; Professor Silverio M. Cendaña, entomology; Dr. Francis A. Santos, head, Department of Agricultural Chemistry; Dr. Leopoldo Villanueva and Dr. Julian Banzon, agricultural chemistry; Dr. Dionisio I. Aquino, head, Department of Soils, and Dr. Nicolas Galvez, soils; Dr. Gerardo O. Ocfemia, head, Department of Plant Pathology; Dr. Francis M. Sacay, head, Department of Agricultural Education, and Professor Andres Aglibut, agricultural education; Dr. Rafael B. Espino, head, Department of Botany; Dr. Anastacio L. Teodoro, head, Department of Agricultural Engineering, and Professor Alejandro Catambay, agricultural engineering; Dr. Leon Gonzales, head, Department of Agronomy, Dr. Pedro A. David and Dr. Jose M. Capinpin, agronomy; Dr. Valente Villegas, head, Department of Animal Husbandry, and Dr. Mariano Mondoñedo, Professor Felix B. Sarao, Dr. Francisco M. Fronda, Dr. Lorenzo P. Zialcita, animal husbandry. The last named returned from America on the staff of President Osmeña at the time of the liberation. These specialists are desirous of resuming communication with their correspondents in the United States, and are particularly anxious to receive reprints of scientific papers in their fields.

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THE AIR FORCES' COLLECTION OF AERIAL PHOTOGRAPHS

DURING the course of the war and previously the Army and Navy Air Forces have accumulated a collection of aerial photographs covering a very substantial part of the earth's land surface. Aerial mapping has developed to an extent where it will largely supersede conventional mapping from ground surveys. The art of interpreting aerial photographs in terms of vegetation, geological structure and even depth of water, as well as cultural features, before the war in a more or less experimental stage, has developed into a powerful tool to be used in many branches of research in geography, geology, botany, ecology and conservation, as well as being indispensable in modern exploration.

The actual extent of coverage of the earth is not yet known and will not be for many months. The negatives are still coming in to Washington from all theaters of Army and Navy activity. They must be rewashed to insure against deterioration. Prints must be made and examined. Data must be assembled and the negatives catalogued. This is an enormous task that may well continue for several years before any one has an adequate idea of the full value of this photographic collection.

Since the greater part of this aerial coverage is of overlapping shots it may be studied stereoscopically, bringing out detail undreamed of in ordinary examination of single prints. The mapping of vegetation types made possible by this technique will lay the foundation for a complete and detailed knowledge of the plant covering of the earth, even in regions hitherto practically unknown. Much information on physiography and such structural geology as may be deduced from physiography will become available, laying the foundation for intensive study on the ground. Much time may thus be saved and a far more dependable framework for all types of geological studies will be provided than ever has been available before. For geography and ecology, not only will there be suddenly available an enormous amount of basic data, but a reference point in time may be established from which to study and measure changes of many types and magnitudes over both long and short periods of time. The greater portion of the negatives being on cellulose acetate film, they may be expected to last without recopying for periods of hundreds of years. Basic to all branches of science, material is now available for detailed mapping of the earth's surface, and methods of preparing such maps are far more satisfactory than ever before.

It is, of course, unnecessary to urge the value of this accumulation of photographic data to any one who has any idea of its extent and quality. It will suffice merely to indicate its existence to those who are not aware of it. The important question to be posed by this article is that of the future preservation and availability of this material. Many of the scientists who have some knowledge of the collection are expressing concern as to what shall become of it.