

Science Education on the Island of Guam

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The author tells of Guam efforts to use BSCS materials. He has had 3 years of experience there.

Guam, America's westernmost territory and the largest and most southerly of the Mariana Islands, lies in the western Pacific Ocean about 1,200 nautical miles east of the Philippines, 1,500 miles south of Japan, and 3,500 miles west of the Hawaiian Islands. The island, 30 miles long and tapering in width from 8 miles to 4 miles at the center, has a sub-tropical climate, with an average temperature ranging between 70° and 90° F with an average annual rainfall of approximately 90 inches.

Guam's 24,000 pupils attend 20 public and seven private elementary schools and seven public and eight private secondary schools. The two public senior high schools enroll 2,000 students each. The College of Guam, a four-year B.A. granting college established in 1952, has an enrollment of 500 full-time students and approximately 700 part-time students.

Of the 800 teachers on Guam, 500 are employed in the elementary schools. Approximately 200 of these teachers lack a B.A. de-

gree. The reason for this is two-fold—first was the lack of teacher-education standards prior to WW II and the Japanese occupation of Guam; secondly, the lack, until recently, of an institution of higher education within a reasonable distance. When the College of Guam became a four-year college in 1963, steps were taken to improve science education on the island. The College received an NSF equipment grant for science films and physics equipment. This was followed in 1964 with an NSF BSCS In-Service Institute for the secondary science teachers. The Department of Education installed a pilot study in the BSCS Green Version in one high school. The year was highly successful, and with concentrated effort the Green Version was adopted for Guam. Many of the exercises were rewritten for the local flora and chapter nine dealing with the ocean was expanded. The following year, the pilot study was expanded to eight classes. In 1965, the other public high school adopted the BSCS Green Version and now has eight classes.

One class of BSCS is now being conducted in a parochial high school.

A 1965-66 NDEA grant was largely spent on the purchase of biology films for the secondary level. The College sponsored another NSF In-Service Institute for junior high school teachers, covering chemistry, physics, and biology, including local flora and fauna and coral reef ecology. Efforts were then channeled to the elementary level with an 1966 NDEA six-week summer elementary science workshop.

When school started in August, 1966, the College of Guam, Department of Education, and the NSF conducted a two-day orientation conference for all secondary science and mathematics teachers, to acquaint the new teachers with the experienced science and math teachers, and with the College, and to serve as a review session on local flora and fauna. On the second day, five of the eight plant communities were visited. This same special project grant provided partial support for an All-Island Mid-Year Conference for elementary teachers and secondary science and mathematics teachers. It was the first All-Island professional teachers' meeting to be held in Guam and the 3 million square miles of the Trust Territory. Five hundred teachers attended. Most of the leading textbook publishers sent representatives, some from as far away as Chicago and Tokyo, and over 80 companies contributed materials.

The 1966 summer project was followed up with an NSF General Science In-Service Institute for elementary teachers. Additional science enrichment was added by the NASA spacemobile program.

The science teachers themselves have organized the Guam Science Teacher's Association. Officers and members come from all educational levels, primary through college, and include interested persons from other areas of the community. The GSTA newsletter always contains an article of some aspect of science relevant to Guam, and each monthly meeting has a recognized science authority give a lecture and demonstration. Monthly field trips range from exploring Japanese-built bunkers of WW II to touring atomic submarines.

In 1966, three conservation areas were

established by Proclamation of the Governor. Agana Springs, located near Agana (map) was once the main source of water for this part of the island. The springs are situated at the base of a large limestone plateau, and its water spills into the vast marsh region known as Agana Swamp at a rate of two million gallons daily. The springs and 25 acres of the adjoining swamp were set aside for a conservation area, which is rapidly becoming the most popular of the field trip areas.

Adjacent to the College of Guam campus, a 12-acre conservation plot on a 200-foot limestone plateau was also established. Thought by many Pacific biologists to be one of the least disturbed and most typical of any limestone forest community in the Mariana Islands if not all of Micronesia, this area is the most accessible, being within walking distance of both the college and the new high school. Plans to extend this area down the 200 foot cliff to the ocean's edge are now being undertaken.

Six-acre Anae Island, just south of Agat Bay, is the least accessible of the conservation areas and is used as a bird nesting site by the Guam Fish and Wildlife Department.

Educational television programs in science are presented each Monday evening as part of the College of Guam's "Spotlight on Education" series. Another six week science summer workshop for elementary teachers was held this past summer. In addition, in 1967 the college had an NSF Summer Institute in Tropical Ecology and Environmental Chemistry for secondary science teachers from Guam and the Trust Territory.

What about science education in the future? The following are relevant considerations:

Guam is out of the mainstream of American education.

The birth rate is one of the highest in the world.

The island lacked an institution of higher learning until recently.

Effects of WW II are still noticeable in the present educational system.

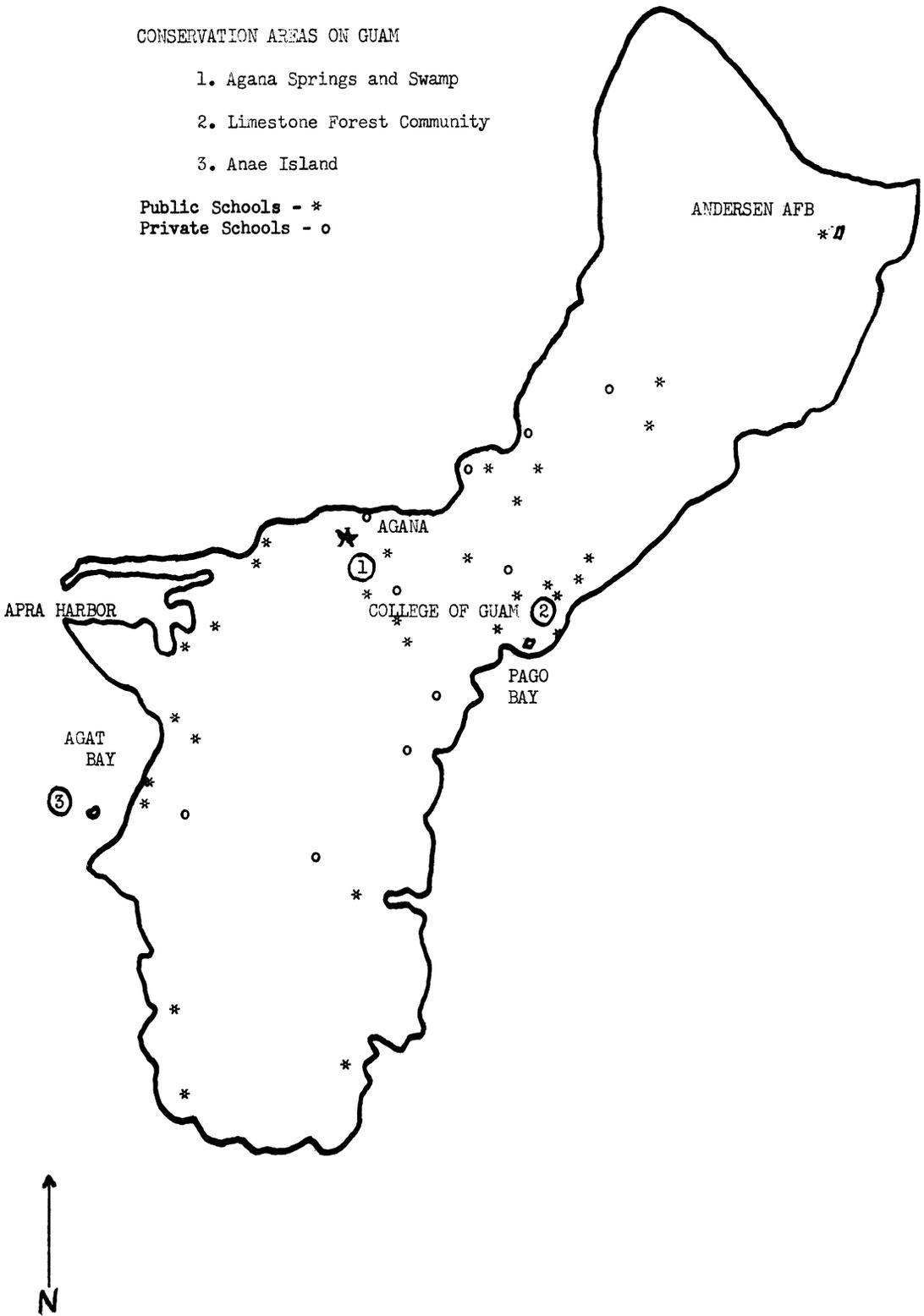
All the pupils are Americans and must compete for jobs with stateside students.

There has been a great influx in military personnel and their families due to the Vietnam crisis.

CONSERVATION AREAS ON GUAM

1. Agana Springs and Swamp
2. Limestone Forest Community
3. Anae Island

Public Schools - *
Private Schools - o



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The College of Guam is the only institution of higher learning serving Guam and the Trust Territory—an area roughly the size of the United States—

These would seem to indicate need for an accelerated program, with an increasing

number and variety of in-service institutes at all levels, the addition of more or expanded professional conferences, the adoption of new elementary science programs, and the initiation of more supplementary programs funded locally and federally.

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the prolonged isolation of the high school classroom.

First hundreds and then thousands of teachers became part of this vast curriculum movement. At this time, judgment is not being made about the materials produced. What is important is that teachers were able to break away from the traditional modes and patterns, to try new things in new ways, and to assert their own professionalism in their teaching. These events widened the horizons of thousands of high school biology teachers. In the past few years, many of my friends have gone to junior college and university biology teaching; others have realized their strategic position in helping to bring about changes in the elementary schools of their areas. I myself am on leave of absence to work with an exciting elementary school curriculum study which has, among other features, a conceptual framework for the life sciences from the kindergarten through the sixth grade. So you see, the horizons of the high school biology teacher have widened. We are doing good work in our classrooms; many of us are active on the college level; and many are influencing the elementary school science curriculum.

In our professional organization, the National Association of Biology Teachers, the same kind of widening of horizons has been noted recently by our Board of Directors. Although many still think of NABT as a high school biology teachers' organization, within the past few years there have been changes in organization participation and programs. University people are looking to NABT for leadership. More university people have taken on responsibilities in the organization. A recent example of our expanding role is the series of nine NABT Regional Seminars funded by NSF; here, university and high school biologists cooperated in a very successful operation. We also find increasing

NABT interest and activity in elementary school education. In fact, the increase of articles about junior college and university teaching as well as those about elementary school biology, both national and international, reflects the widening interests of NABT.

Clearly an example of this widening scope is the program of the NABT First Annual Convention, being held in February in Anaheim. Here are meetings planned not only for the high school biology teacher, but some for the junior college and university biologist, and also some for the elementary teacher. Perhaps, in the near future, our membership by university and elementary school people will not rise as swiftly as we should like. However, the great influence that high school biology teachers can have on both college and elementary school levels will continue to be reflected in our activities, for our organization is in a critical position, a position of great opportunity, a position allowing us to be helpful on all levels of education. With the aid of our more than 7,000 members, NABT can look to the rewarding years ahead.

Jack Fishleder
President, NABT

Falciparum Malaria

The problems posed by drug-resistant strains of falciparum malaria, which have developed in Southeast Asia, may be eased, but not solved, through treatment with a sulfonamide-pyrimethamine combination.

Quinine remains the best drug available for patients who do not respond to synthetic antimalarials such as chloroquine. But if quinine fails to cure the infection, cannot be used, or is unavailable, then the sulfonamide-pyrimethamine combination should be considered.