



Lake Volta will cover four percent of Ghana.

Rear-guard Ecology

Biologists fight the clock as man-made lakes create new problems.

African biologists are now organizing to ensure that the three big hydroelectric dams in West and Central Africa will do their share to fill Africa's pressing need for a cheap source of protein, and to prevent inadvertent biological problems.

Originally, the dams were conceived exclusively as sources of cheap hydroelectric power on which to base a modern industrial economy. Designs were entrusted solely to hydroelectric engineers, with little thought to the far-reaching consequences of so revolutionary a change in geography and ecology.

In Ghana, for example, new Lake Volta, behind the dam completed in 1964 on the Volta River, will eventually cover four percent of the area of the country. Yet almost no plans were made for developing a fishing industry on the lake or for combatting the disease-carrying insects and mollusks which would breed there.

The proposed hydroelectric project on the Niger River at Kainji in Western Nigeria was in a similar situation.

In February 1965, the Institute of Aquatic Biology of the Ghana Academy

of Science was created and placed under the direction of Dr. Letitia Obeng, a vivacious Ghanaian who had just returned from graduate study of fresh water biology at the University of Liverpool in England.

By 1966, the institute had already played host to a major international symposium on man-made lakes. This year, Dr. Obeng hopes to have completed the first year-long study of plankton movements in Lake Volta, an essential prerequisite to understanding fish migrations.

The most pressing biological problem created by the new lakes concerns not fish but aquatic plants. This is most serious on Lake Kariba on the Zambizi River that separates Zambia and Rhodesia in the old British Central Africa. The lake covers what was once 200 square miles of flat lands, so that a relatively small decrease in water height can expose a disproportionately large land area. When water height returns to normal, submerged land plants decompose and provide food for large quantities of plankton which in turn create rich feeding grounds for fish.

Unfortunately for Zambian and Rhodesian fishermen, shallow water is also an ideal habitat for the water hyacinth, a beautiful South American plant first introduced into Africa as a pond decoration. The water hyacinth grows so thickly in shallow tropical waters that it has blocked navigation in the shallow parts of the Kariba and in similar lakes in the Sudan and elsewhere.

Neither the Niger nor the Volta River systems are known to harbor water hyacinth, and African plant protection officials are working hard to prevent florists' shops from inadvertently introducing them. Instead, biologists at Kainji and Lake Volta must worry about a different aquatic plant, *Pistia stratiotes* or water lettuce.

The problem with *Pistia* is its propensity to pick up hitchhikers. Shallow waters are excellent breeding grounds for such disease vectors as malaria mosquitoes, the snails that carry the parasite of bilharzia (*Schistosomiasis*), and the *Mansonia* mosquitoes that carry the microfilaria (tiny roundworms) that cause elephantiasis. Dr. Obeng examined bits of *Pistia* floating in Lake Volta—and found that a high proportion of them were carrying snails and mosquito larvae.

A similar program of biological research on the Kainji Dam area in Nigeria was undertaken last September by a United Nations Food and Agricultural Organization project with headquarters at Ibadan, Western Nigeria. This Kainji project is headed by Dr. William A. Evans, a Californian with years of experience planning the biological end of dams in the American West. In Nigeria, Dr. Evans faces the greater challenge of organizing a research effort designed to provide a maximum of information about the Niger River and the land that will form the floor of the lake behind the Kainji dam—before the completion of the dam, now scheduled for July 1968.

In addition to biologists, Dr. Evans' staff boasts a Harvard-trained anthropologist, Don Jeunesse, to lay the groundwork for the resettlement of tribes living along the river and the training of the many fishermen who will fish the new lake. One of Jeunesse's first jobs will be to prepare the villagers for the demoralizing effects of the huge fish kills that follow the first flooding.

There is also the problem of keeping displaced villagers from starving while the lake fills, without giving them a permanent dole psychology.

Nigeria anticipates little difficulty in attracting fishermen to the new lake once the fish population has returned to normal. In contrast to East Africans, who regard fishing as a low class occupation to be undertaken only as a last resort, West African villagers are often good part time fishermen.

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