

Loaded with tuna

The mysterious Guinea Tide off the West Coast of Africa is promising a new fishery in the Atlantic

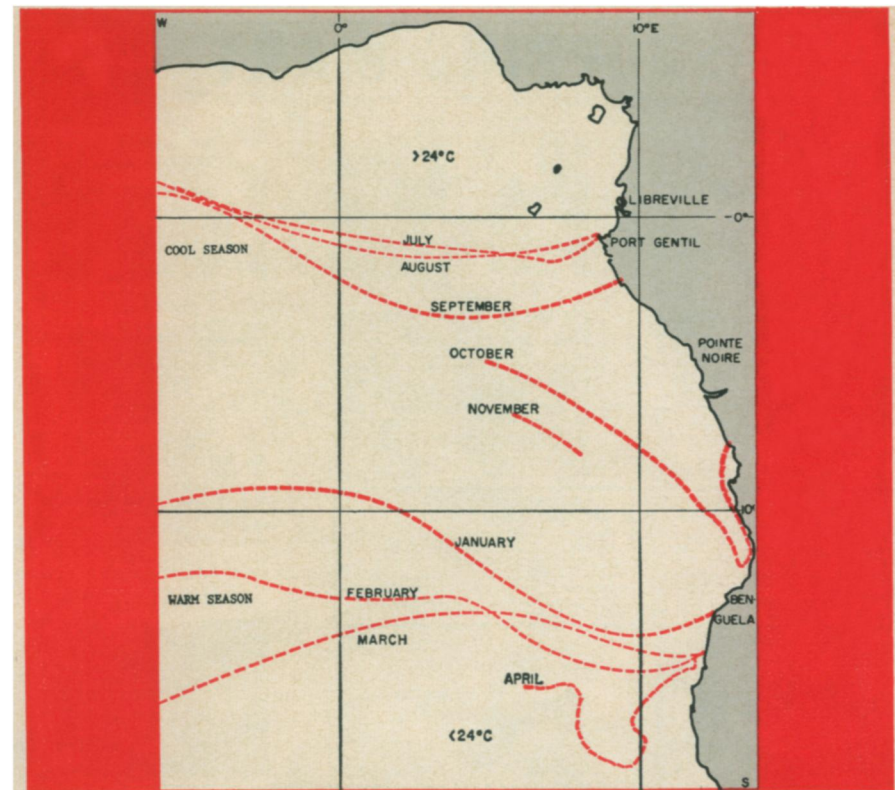
A few years ago oceanographers were intrigued and fishermen delighted by the discovery off the Atlantic coast of Africa of an enormous seasonal water movement, carrying with it large schools of prime tuna.

A just-returned U.S. oceanographic expedition has now filled in some of the details on the water movement, and confirmed that it is rich hunting ground for fishermen.

But they still don't know what makes it move.

The West African oceanic probe was made by a team of oceanographers and marine biologists headed by Dr. Grant L. Beardsley Jr. from the staff of the Bureau of Commercial Fisheries' Tropical Atlantic Biological Laboratory in Miami, Fla. They have just returned aboard the laboratory's 143-foot research vessel, *Undaunted*, after four months and 18,000 miles of investigations.

The mysterious water movement or front has come to be known as the Guinea Tide, because it originates in the Gulf of Guinea, below Africa's great western land bulge, at a point close to the equator and approximately on an east-to-west line parallel to the cities of Libreville and Port Gentil in Gabon. It was first noted early in 1966 by scientists attached to France's Office de la Recherche Scientifique et Technique Outre-Mer. (While France has pulled out of West Africa, its oceanic research stations are still maintained at Abidjan, Ivory Coast; at Pointe-Noire, Congo (Brazzaville), and



Seasonal movement of ocean front charted by U.S. oceanographic expedition.

at Dakar, farther north in Senegal.)

Despite the coolness that has developed between the U.S. and the de Gaulle regime, French and American ocean research groups continue to exchange reports. It was the Pointe-Noire staff that first became aware of and advised U.S. scientists about the oceanic water movement and the massive schools of fish it attracts.

The discovery occurred when exploring fishing vessels that had not previously worked the region made unprecedented catches of yellowfin tuna. Yellowfins range up to 150 pounds and are the most sought after of all the tuna species, since they consistently bring premium prices. The craft also made substantial catches of the smaller but highly valued skipjack tuna.

French marine biologists reported that the Spanish seiner *Lerez* landed 85 tons of yellowfin and eight of skipjack in only six days of fishing. Later checks showed that in 117 trips, vessels using the less efficient baited pole lines caught more than 14 million pounds of fish, of which about 90 percent were the prized yellowfin.

French oceanographers then discovered the tremendous seasonal oceanic water movement. It had apparently gone unnoticed because it travels slowly, advancing only about seven or eight miles per day. Moreover, it is centered in a region that has never before been heavily fished or used as a major shipping lane.

When the front gets under way, it is as powerful as any daily oceanic

tide, sweeping along a broad area the exact perimeter of which has not yet been charted. It heads southward above the cold Benguela Current, which is not affected, and which flows steadily northward from the lower reaches of the Atlantic. Also flowing north above the Benguela Current is a warmer oceanic stream known simply as the Tropic Water, but the Guinea Tide is powerful enough to push this back southward.

Thus, when the Guinea Tide is moving southward, it is traveling opposite to the known counter-clockwise rotational pattern of the South Atlantic Gyre, which is what creates the northward flow of the Benguela Current and the Tropic Water.

"We took hundreds of oceanographic readings in the Gulf of Guinea and on southward," Dr. Beardsley says. "It appears this Guinea water works close in to shore along the coast and seemingly at its peak extends up to 1,000 miles south of the equator, a remarkable distance for such a phenomenon. This takes it past the mouth of the Congo River and its great outpouring of black water, and on beyond the towns of Lobito and Benguela, in Angola. We also took readings westward 135 miles from the coast and still found evidence of the front. It may extend still farther to the west. There are also indications that, at the southern perimeter limits, it swings back north like the curve on the bottom of an S."

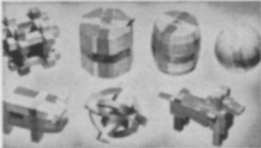
The movement of the front apparently starts on the equator in the Gulf of

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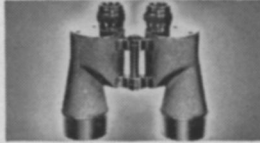
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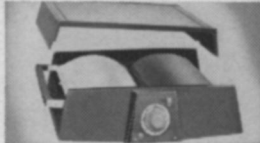
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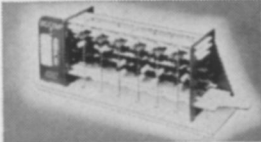
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... Guinea Tide charted

Guinea sometime in late September or early October, Dr. Beardsley says. During November and December it is rather poorly defined, but when it is found the southerly movement is always quite definite. The front seems to stabilize suddenly in January as it keeps heading south, and remains that way up through late April or early May when, for reasons that are so far unknown, it suddenly reverses and heads back north toward the Gulf of Guinea.

"We do not yet know what forces activate or govern the movement of this vast body of water," Dr. Beardsley says, "and there may well be factors about it that will never be solved." The front seems mainly to involve a 24-degree C. isotherm (area of constant temperature). But it is, in reality, a whole group of isotherms ranging from 22 to 30 degrees C. These conditions, and certainly others that will be disclosed in the months to come from analyses of the readings, apparently result in heavy concentrations of plankton and small food fish which, in turn, attract the big schools of tuna.

During the voyage, Dr. Beardsley says, sightings were made of 55 major schools of yellowfin and skipjack tuna, along with lesser ones.

Up to now, American craft have undertaken very little tuna fishing in any part of the Atlantic. For decades, the main U. S. tuna fleet of about 110 sizeable vessels has been concentrated in southern California. Employing highly efficient purse seines costing about \$50,000 each, they work southward to central Chile. But there have been difficulties with Ecuador and Peru objecting to operations of the craft off their coasts.

On top of these problems, in 1966 the Pacific catches of yellowfin tuna began to drop sharply. There were also decreases in skipjack landings. The Inter-American Tropical Tuna Commission, of which the U. S. is a member, promptly set closed seasons on yellowfin extending for months, as well as catch limitations covering open periods. This has been costly to the Pacific tuna fleet and keeps many of the vessels idle for long periods.

Preliminary reports of the big yellowfin schools found in the Guinea Tide last year prompted three U. S. tuna craft to fish the region experimentally. The Bureau of Commercial Fisheries reports that they came back with more than half a million dollars worth of yellowfin and skipjack. Owners of more than a dozen of the U. S. Pacific tuna ships have already announced that they will fish African waters this fall, and others are expected to follow.

Lee Gebhart