

THE *American* Surveyor

A FOOT IN THE PAST... AN EYE TO THE FUTURE

March 2007

Message *in a* Bottle



Scanning the Temple Mount

Monitoring changes in ancient walls

Eminent Domain


Anti-development or social benefit?

Yankee Ingenuity

Economy + Efficiency

Message *in a* Bottle





When thinking of past scientific measuring instruments developed by the United States Coast & Geodetic Survey (C&GS) over the past two centuries, a message in a bottle probably doesn't come to mind. For most people, the allure of placing a message in a bottle and sending it adrift to an unknown place can only be surpassed by actually finding one. The message contained inside the bottle usually had one main purpose – to elicit correspondence from the finder.

When C&GS added the use of drift bottles to its array of observation techniques in 1846, the main objective was an attempt to determine the route of the ocean currents. The success of the experiment after launching the bottles depended upon three main factors – someone finding the bottle, a record of its location, and the date that it was discovered. The latter two would provide C&GS with not only the direction of the ocean current, but also its speed.

The Gulf Stream, together with its northern extension, the North Atlantic Drift, is a powerful, warm, and swift Atlantic Ocean current that originates in the Gulf of Mexico. It flows around the tip of Florida, and up the eastern coastlines of the United States and Newfoundland before crossing the Atlantic Ocean. At approximately Latitude 40° North, Longitude 30° West, it splits in two; the northern stream crosses to northern Europe, and the southern stream recirculates off West Africa and back to the Gulf of Mexico. Information about the Gulf Stream benefits seagoing vessels and helps to demonstrate how currents influence the climate of the eastern coast of North America and the western coast of Europe.

The first C&GS bottles were tossed overboard from a ship known as the *Washington* on July 27, 1846. The selected location was off the eastern United States coast in an area known to be in the Gulf Stream. After traveling across the Atlantic Ocean for nearly a year, one bottle was discovered on the beach near Kerry, Ireland on June 27, 1847. Two other bottles

>> By Jerry Penry, LS



A chart of the Gulf Stream by James Poupard, sculp. [Philadelphia, Pa.: American Philosophical Society, 1786?] Appears in the *Transactions of the American Philosophical Society, 1786*. Includes inset of North Atlantic and text in left margin “Remarks upon the navigation from Newfoundland to New-York, in order to avoid the Gulph Stream on one hand, and on the other the shoals that lie to the southward of Nantucket and of St. George’s Banks,” by B. Franklin. *Courtesy Library of Congress*

from a different group were launched that same year inside the Gulf Stream, but closer to shore. Their journeys were less spectacular, arriving at Nag’s Head, North Carolina, in just a few days.

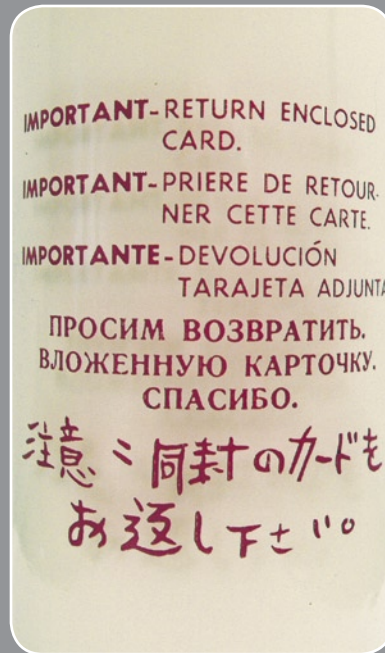
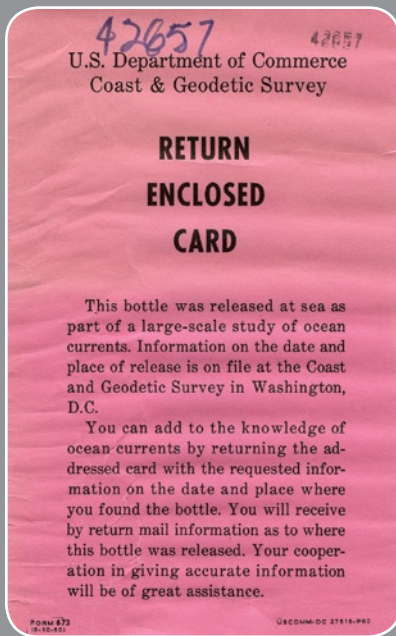
The existence and approximate location of the Gulf Stream had been discovered long before C&GS began its scientific studies. One of the earliest maps depicting the location of the Gulf Stream was the *Franklin-Folger Chart of the Gulf Stream*, published in 1769 by Benjamin Franklin and his cousin Timothy Folger. On their map the Gulf Stream began off the eastern tip of Florida, with Franklin and Folger

apparently having no knowledge at that time of the Gulf Stream’s true origin in the Gulf of Mexico. (See Poupard’s 1786 map of the Gulf Stream above.)

On April 8, 1854, C&GS released drift bottles from the U. S. Steamer *Walker* at Latitude 28°57’ North, Longitude 88°15’ West, in the Gulf of Mexico approximately 78 miles southeast from the tip of Louisiana. Two months later on June 6, 1854, a beachcomber found one of these bottles on the shore near Daytona, Florida. Aside from the location of the discovery, the finder of this bottle added valuable information that indicated he had been

through the same area just four days earlier and had not previously seen the bottle. The discovery of this drift bottle provided information that it had traveled about 750 miles, if having taken a straight course, in the span of 59 days. While this information seems crude by today’s standards, it was valuable to C&GS in determining the direction of the Gulf Stream and the fact that it did originate in the Gulf of Mexico.

A bottle thrown from the U. S. Schooner *Gallatin* on October 30, 1854, at Latitude 40°26’30”, Longitude 73°50’ West, off the coast of New York was discovered on the beach at Santa Cruz,



Graciosa Island, Azores, on June 13, 1855. Another bottle that had been released by the *Gallitin* that same day at Latitude 40°23' North, Longitude 73°53' West, was discovered on the shore at North Caicos north of Haiti on November 20, 1856. This bottle had almost completely traveled the entire Atlantic Gulf Stream.

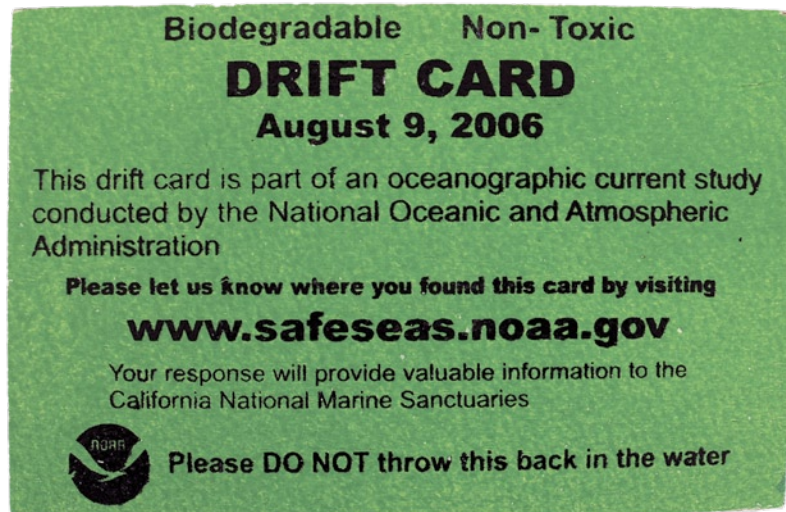
Because of the low percentage of drift bottles that are actually recovered, they were usually released in large quantities, sometimes numbering into the thousands. This required a great deal of expense and time to purposely conduct such an experiment. Accidental cargo releases from ships, however, have generated valuable information in the past couple of decades. In late May of 1990, the container ship *Hansa Carrier* encountered a severe storm in the area of Latitude 48° North, Longitude 161° West while traveling between Korea and the United States. Twenty-one containers were swept off the ship by large waves with five of them containing Nike running shoes. Four of the shoe containers were known to have broken open and dispersed more than 60,000 shoes into the Pacific. The following winter more than 1,300 of these shoes were reported to have washed up on the shores of Vancouver Island, Washington, and Oregon. Unfortunately the once-boxed shoes were not tied together in pairs, so lucky beachcombers

had to continue searching or trade in swap meets for matched pairs.

Less than two years later on January 10, 1992, another container vessel crossing the stormy North Pacific between Hong Kong and Tacoma, Washington, lost a dozen containers at Latitude 44.7° North, Longitude 178° East. At least one container containing an estimated 29,000 small plastic bathtub toys was ripped open as it hit the water. Ten months later an array of blue turtles, yellow ducks, green frogs, and red beavers began washing ashore near Sitka, Alaska, providing yet another source of valuable

data through accidental circumstances. To this day these bathtub toys are continuing to wash up on the shores all around the earth, including the eastern shore of the United States.

The recovery rate for both purposely released drift bottles and accidental cargo releases has proven to be just less than 3 percent. These are the items that have been found in measurable quantities in one particular area around the same date. The remaining items have either been picked up individually and not reported, or are still out there continuing their wayward drift.





POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE

The Director
Coast and Geodetic Survey
U.S. Department of Commerce
Washington 25, D.C.
U. S. A.

Form 672

FINDER OF THIS BOTTLE

Please furnish the desired information and mail this card.
No postage necessary if mailed within the United States.

Date when found.....

Place where found (give nearest coastal town or prominent reference point, give state and country).....

Comments.....

Your name (print).....

Your address (print).....

42657

Researchers have learned that ocean surface currents can be chaotically changeable. Two identical items released at the same location and at the same time can end up in vastly different areas. Severe storms that alter normal weather patterns also play an important role in the movement of drift items.

The last occurrence of C&GS using drift bottles occurred between the years 1958 and 1966. These bottles, which were seven fluid ounces in size and eight and one-half inches tall, contained both a numbered note and postcard. While the note and postcard were printed in English only, the outside of the bottle had wording printed in five different languages (see images).

Today most oceanographers use satellites and high-tech buoys for tracking items, however, many conservation agencies continue to use drift items to track the movements of the ocean for

things such as invasive species or to simulate potential catastrophic oil spills. The preferred item now used for tracking movements is the drift card. These cards are usually constructed from highly-visible colors in waterproof envelopes. The more preferred method is the use of a card made of a biodegradable material that dissolves after a period of time. The biodegradable cards are important because of increased awareness that foreign objects could potentially harm marine life or be considered waste material in the oceans. These cards can be dropped in large quantities from aircraft, and it is assumed that the cards have less friction upon the surface of the water than the traditional bottles which could be affected by wind.

With increased data, it is becoming apparent that major surface current systems, once thought to be stable, are capable of huge and sudden shifts.

Top: The accidental release of approximately 29,000 plastic bathtub toys from a cargo ship on January 10, 1992 provided valuable data about the tracks of ocean currents. *Photo by David Ingraham.*

Bottom: Purposely released drift bottles by C&GS each contained a postcard instructing the finder to report the date and location of the discovery.

While not always scientifically appealing due to their simple nature of construction, drift items have proven to accurately trace the movements of our ocean waters, where modern computers at best can only simulate possible patterns. *AS*

Jerry Penry is a Nebraska licensed land surveyor. He is a frequent contributor to *The American Surveyor*, and has written numerous articles for other newsletters and magazines.