

A VOICE FROM THE PAST: JOHN LYMAN AND THE PLATE TECTONICS STORY

By Ben J. Korgen

JOHN LYMAN was a chemical oceanographer who became an administrator later in his career. He was born early enough (in 1915) to have been referenced in *The Oceans* (Sverdrup *et al.*, 1942) for his work on the composition of sea water. Before I knew him, he had been (among other things) director of the oceanography division at the U.S. Navy Hydrographic Office, program director for oceanography at the National Science Foundation, oceanography coordinator for the Bureau of Commercial Fisheries, and writer for *Encyclopedia Britannica*. When I met him, he was marine science coordinator for the University of North Carolina statewide system.

In the latter position, John maintained an office in a converted home on the University of North Carolina, Chapel Hill campus. This home also housed the UNC-CH Marine Science Curriculum headed by Ed Kuenzler. With the help of John and Ed, I was hired in the summer of 1969 as the first physical oceanographer ever to work full time on UNC's Chapel Hill campus. (I was at the time a newly minted Ph.D. out of Oregon State University.)

Although John was a coordinator for marine science activities on several campuses, his office was on the Chapel Hill campus, and he taught chemical oceanography in the UNC-CH marine science curriculum. This meant that he and I would interact a good deal more than we would have if his office had been located on one of the other campuses of the state university system.

One day in February of 1972, John handed me a typed letter titled "Memo for History of Oceanography File." I read it, felt honored that something John thought important was entrusted to me, and promptly filed it. (At the time, I had no burning interest in history.) Several years rolled by, John passed away, I thought about his memo, but more years rolled by. Then I read the recent "Hail and Farewell" message in the Quarterdeck section of *Oceanography* (Atkinson and Sancetta, 1993). It jarred me into realizing that Lyman's memo certainly deserves a readership wider than

one person (or one plus the secretary who typed it). So without further introduction, here it is in the unedited words of John Lyman.

Dr. Korgen

Memo for History of Oceanography File

Subject: R.G. Mason's geomagnetic surveys in PIONEER

In the middle 1950s, the Navy had a requirement for detailed bathymetric surveys of the sea floor off California. I do not now remember the reason, but it was probably related to studies of the propagation of sound in the deep sound channels. At that time the Coast & Geodetic Survey had a vessel available, the PIONEER, as well as the capability for accurate position-fixing that is a requisite for detailed bathymetry. (I forget whether they used EPI or Loran C.) The Navy had the money, and it was arranged to employ the PIONEER full time for a year or so. Technical direction, such as preparation of the survey specifications, was left to the Hydrographer of the Navy.

Concurrently, Scripps Institution was using towed magnetometers at sea and was obtaining interesting results along cruise tracks. To avoid the magnetic signature of a ship, the device had to be towed astern. To Naval types it thus presented a mental hazard to the successful operation of a program, since the ship would have to slow down each time it was hauled in; and if the ship came to a stop without this precaution the cable would undoubtedly wrap around the shaft.

When news of the forthcoming operation reached Roger Revelle at Scripps, he immediately saw an opportunity to obtain two-dimensional data instead of linear tracks and proposed that Scripps provide a magnetometer and operator (R.G. Mason) and that towed magnetometry be added to the PIONEER program. The acquisition of precise positioning and soundings concurrently with magnetometer recordings of course would greatly facilitate interpretation of the magnetic readings, and at the same time the magnetometer data would improve interpretation of the sounding data. The first Scripps effort in this regard, through ONR channels (I suppose), was turned down on the basis that the urgency of the PIONEER survey would make

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any slowing down of the ship, such as is inherent in streaming a magnetometer, unacceptable.

I forget now why I was in close contact with Revelle at this time. It was probably the late spring of 1955. Anyway, he bent my ear on the subject of the desirability of the towing of his magnetometer by the PIONEER, and sold me. (I was Director of the Division of Oceanography at the Hydrographic Office. Bathymetry, gravity, and magnetics were not then regarded as pertaining to oceanography but were the responsibility of the Division of the Chart Construction, and I was not expected to concern myself with the affairs of another Division.) So I took the matter to the then Hydrographer, who was captain Joe B. Cochrane, and after a certain amount of persuasion on my part he agreed that Mason and the magnetometer could be added to the PIONEER program, with the understanding that maneuvering the magnetometer cable would not add more than 2 hours in a week (or was it a month?) to the PIONEER's time at sea, and that the survey specifications would authorize the commander of the PIONEER to cut the cable and abandon the instrument any time he felt that the safety or success of his mission required such action.

On a naval vessel the magnetometer would not have lasted 36 hours under such a directive, but the Coast & Geodetic Survey corps is a different breed. I think there are one or two holidays in the PIONEER's magnetic record, but in general Mason managed to fill up most of the topography surveyed by the ship with magnetic contours.

He also surmounted another difficulty: secrecy. Navy policy in those days was that detailed bathymetry and associated geophysical data (gravity, magnetism) had to be withheld from friend and foe alike. But Mason managed to extract an anomaly, subtracting the average signature from the observed signature and publishing only the difference, which somehow was felt not to be classified. And these anomalies revealed enough of the curious lineations of magnetic topography in the region around the Murray Fracture Zone

(Mason, 1958) to induce other laboratories to carry out the same kind of magnetic surveys in their marine geophysical programs. It was not many more years before a couple of sharp-eyed graduate students at Cambridge (Vine and Matthews, 1963) were proposing in *Nature* that this geomagnetic pattern of the sea bed was the result of sea-floor spreading.

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JOHN LYMAN

So what can we learn from this voice from our past? First, we can make an effort (as John did) to write down our gems of history. (While our research efforts seem to be in good hands, the historical aspects of our field seem to be more nearly left to chance.) Second, we can either get these gems directly into print or at least can get them into the hands of someone who can be trusted to put them to good use. Third, we can learn something from the specific memo at hand. This might be that without the ideas of Roger Revelle and the persuasiveness of John Lyman, the eye-opening magnetic data that confirmed sea-floor spreading and led to our present view of plate tectonics might not have been available as early as 1958. Just how long it might have taken to discover the sea floor's linear magnetic anomalies without Mason's report is anyone's guess.

References

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