A New Proposal

Jan P. Dut

A great deal of time and effort is being spent in developing new methods of processing seismic data. One of the toughest problems, migration, has been the focus of much of this effort because it is the key to making complicated seismic sections understandable. The concept of converting seismic section from a map of time to a map of distance sounds simple enough, but not even the brightest have been able to program a computer to do a good job without using a great deal of computer time. Perhaps we should step back and look into other fields for clues on how to solve the problem. The most obvious place to look first is at nature. Does anything in nature resemble what geophysicists are trying to do?

After thinking about this, I came up with an answer. Dolphins and bats use echo sounding to detect what their environment is like. This is a direct analogue with what geophysicists are trying to do, but at higher frequencies. Bats and dolphins use sound in the same way that geophysicists use seismic waves. Surely dolphins have problems with diffractions and multiples, but they are able to navigate the murkiest waters with ease. Dolphins clearly do not drag sophisticated computers behind them in the water. Thus, dolphins are able to process the returning echoes instantly in their brains and get a realistic view of what surrounds them. I propose that we start a research program to study the dolphin brain to discover the algorithms that it uses. Working with dolphins would be easier than bats since their brain is larger. By careful measurement of the brain's electronic signals when the dolphin is presented with certain patterns, the pathway of the signals can be followed. For example, a anticlinally-shaped wall could be placed at varying distances from the dolphin to see how its brain handles the shape. Perhaps a computer chip can be wired the same way the neurons of a dolphin's brain are wired.

If the brain proves to be too complicated to understand, perhaps the dolphin can be attached to the computer in the same way an array processor is. The dolphin would be used to handle the migrations jobs. When a dolphin is young, it could be trained to detect certain

geological patterns associated with oil and concentrate on them. For example, in training the dolphin to process anticlines, a fish could be placed by the crest to get the dolphin's attention. As the dolphin gets older, it spends extra processing effort looking for anticlines. Perhaps more than one dolphin could be used, one for each type of oil formation. One dolphin would look for pinchouts, another would look for reverse faults, and another would look for salt domes.

The possibilities are mind boggling. Imagine having real time migration of seismic data as it is being recorded. A geophysicist can be assigned to each seismic crew to interpret the data as it comes in. He would be able to alter the path of the crew when something interesting appears. For example, the geophysicist could direct a crew to follow a fault. Dolphins would be especially good in marine surveys since they can catch their own food when there is no shooting. One day, every oil company may be boasting about having a "five dolphin migration program".

The public relations possibilities are also vast. Each oil company could make commercials about how they are finding oil using "nature". School children could be invited to watch the dolphins wherever the seismic crews go. Drawing contests of the dolphin or a naming contest among elementary schools can be sponsored to involve young children who are not living in oil producing areas. When a dolphin becomes too old, it can be donated to a zoo where it could do simple migration tricks for the public. Perhaps an oil company could sponsor a television show along the lines of the old *Flipper* shows. In this case, the dolphin could be named Spot, which is short for Bright Spot. For this show, Spot would be working for the oil company. The plot of first show could have Spot stop the world's recession by finding the world's largest oil deposit in Nebraska while dodging bullets from Arabian terrorists.