

REQUIRED READING for better Chromatographic Separations

AN INTRODUCTION TO
HIGH-SPEED LIQUID CHROMATOGRAPHY

MONITOR AND CONTROL
OF
CHROMATOGRAPHIC COLUMNS
USING THE
R-400 SERIES REFRACTOMETER

UV, RI, AND DUAL UV/RI DETECTORS

DEVELOPING A HIGH-SPEED
LIQUID CHROMATOGRAPHY
SEPARATION

ULTRA RESOLUTION
IN LIQUID CHROMATOGRAPHY

REDEFINING CHROMATOGRAPHIC SPEED
USING THE MODEL 6000
SOLVENT DELIVERY SYSTEM

THE PUMP-BARRIER BREAKTHROUGH

SEQUENTIAL ANALYSIS
BY LIQUID CHROMATOGRAPHY

There are four different separation mechanisms in liquid chromatography: namely, Liquid-Liquid (partition), Liquid-Solid (adsorption), ion-exchange and gel permeation (size) chromatography. Complex chemical mixtures may require separation by more than one mode for a complete analysis. By "coupling" the different modes of liquid chromatography in a SEQUENTIAL manner, containing many compounds of both similar and quite different chemical nature can be separated. Sample handling (sample injection and sample collection) is simplified with a fraction collector in series with the detector system. This makes it easy to move from one system to another using SEQUENTIAL liquid chromatography. This makes it easy to move from one system to another using SEQUENTIAL liquid chromatography.

Figure 1 illustrates the technique of SEQUENTIAL ANALYSIS when the sample is first analyzed by gel permeation chromatography and the fraction collector system is then switched to analyze fraction. Column and flow factors required to analyze fraction, column and flow factors required to analyze fraction, column and flow factors required to analyze fraction.

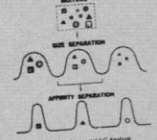


Figure 1. A Typical System

Figure 2 shows a very complex chemical mixture that has been separated by gel permeation chromatography. The mixture contains many compounds of both similar and quite different chemical nature. The mixture is analyzed by gel permeation chromatography, and the fractions are collected and analyzed sequentially.

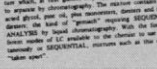


Figure 2. Sequential Liquid Chromatography

Consider Waters' library of liquid chromatography information *your* resource for solving separations problems. We've got factual, concise, and helpful monographs on a wide variety of topics. They are yours for the asking. Send for our complete Applications Index today. (If your separations problem is more pressing, give us a call and we'll do our best to help you.)



**WATERS
ASSOCIATES INC.**

Maple Street, Milford, Massachusetts 01757
Tel No. (617) 478-2000

THE LIQUID CHROMATOGRAPHY PEOPLE

LETTERS

Deep-Sea Drilling

Deborah Shapley's report "Law of the sea meeting: A wet blanket for ocean research" (News and Comment, 14 Sept., p. 1024) was most interesting but told only part of the story.

The spokesmen for the American scientific community have weakened their prospects for a sensible regime for ocean research by their insistence on unlimited freedom. There is nothing sacrosanct about a research vessel. It is just as capable of polluting the seas or creating a hazard to navigation as any ordinary vessel. Moreover, the *Glomar Challenger* has demonstrated a capability to reenter the drill hole in the ocean floor with fresh drill bits that would enable it to strike oil or gas in deep waters. At the same time it has no capability to prevent blowouts comparable to that required of commercial operators. This means that a research vessel could possibly cause a blowout of such disastrous proportions as to pale the Santa Barbara blowout by comparison. Yet, the spokesmen for the American scientific community have persisted in their quest for total freedom from coastal nation control over scientific research beyond a narrow territorial sea.

The U.S. government, in its initial position in the United Nations Seabed Committee, went along with this view and worded its proposed draft of an international seabed treaty of 3 August 1970 accordingly. One need only visualize the reaction of the good citizens of Santa Barbara to word from Washington that neither the federal government nor their own local or state government had any power whatever to prevent a foreign counterpart of the *Glomar Challenger* from proceeding with a deep-sea drilling experiment in the Santa Barbara Channel just beyond the 12-mile limit to appreciate that this position had to be modified—as the U.S. delegation has now done—in the light of our own national interest and that of other coastal nations.

The 1958 Geneva Convention on the Continental Shelf, in a clause incorporated into article 5 of the treaty, reportedly with the active support of the United States, prescribes that

8. The consent of the coastal State shall be obtained in respect of any research concerning the continental shelf and undertaken there. Nevertheless, the coastal State shall not normally withhold its consent if the request is submitted by a qualified in-

stitution with a view to purely scientific research into the physical or biological characteristics of the continental shelf, subject to the proviso that the coastal State shall have the right, if it so desires, to participate or to be represented in the research, and that in any event the results shall be published.

The scientific community has, at times, admittedly had serious difficulties obtaining the consent required by this clause or the comparable consent required by nonadherents to the Geneva convention under customary international law. These difficulties provide a solid basis for seeking meaningful modification of the quoted language. They do not, however, provide a basis for its complete elimination.

The American Bar Association (ABA) has taken a constructive approach to this important problem in the resolution on the natural resources of the sea adopted at its last annual meeting on 6 August 1973. In the portion of this resolution dealing with scientific research, the ABA

(12) SUPPORTS the general principle of freedom of scientific research, but recognizes the right of coastal States, within internationally agreed guidelines designed to provide the maximum practicable application of this principle, to impose reasonable restrictions on activities on their continental margins which will entail threats to their national security or hazards to the environment, as by drilling into the seabed.

The end result of the international negotiations now under way is much more likely to be palatable to the American scientific community if its spokesmen will support this sensible approach to the problem and work with the U.S. delegation for its effective implementation.

LUKE W. FINLAY

224 East 50 Street,
New York 10022

Nitrites in Foods

A. E. Wasserman and I. A. Wolff, who discuss the use of nitrate in their reply to P. H. Schuck and H. Wellford (Letters, 29 June, p. 1322), do not deal adequately with the question of the use of nitrite in cured meat and fish products, which Schuck and Wellford suggest is an unnecessary hazard to health. Wasserman and Wolff also ignore the problem of formation of carcinogenic nitrosamines in vivo (1), which Schuck and Wellford address in their letter. It is this amply