solved at the same time, without denying the nation the benefits of adequate, low-cost energy and an environment of acceptable quality.

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OIL IS FOUND IN THE MINDS OF MEN

Wallace Pratt, one of the great and most eminent petroleum geologists of our time, stated that "oil is found in the minds of men."

It seems that in the decades from 1930 to 1970, a span of more than 40 years, the explorationists have forgotten this one fact. We have depended on black boxes, green boxes, small computers, big computers, and first-dimensional, second-dimensional, and third-dimensional processes and techniques to tell us where to drill a well.

This dependence on instruments has been our profession's greatest mistake and one which was compounded by the petroleum industry which supported and perpetuated this practice. In fact, petroleum management forced our profession to cease thinking about petroleum being found in the minds of men and told us that it could be better found in the transistors of the black boxes and the computers.

A point has been reached where we cannot find the so-called structures on land with these gadgets. Therefore, we have said to ourselves, and industry has said to itself, "A new breakthrough is needed." Unfortunately, in reference to this need, geologists and industry are still thinking of new gadgets for the "breakthrough." The breakthrough should be in the minds of the explorationist. This should be the paramount tool. All of the other gadgets, old and new, will have to be supplements to the minds of men.

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NANNOPLANKTON BIOSTRATIGRAPHY AND SEDIMENTARY PETROLOGY OF A VERTICAL FACIES SEQUENCE CROSSING THE CAMPANIAN-MAESTRICHTIAN BOUNDARY IN CENTRAL ALABAMA

On the basis of the occurrence of calcareous nannoplankton in Upper Cretaceous sediments, exposed in a series of road cuts near Pine Level, Alabama, the sequence is placed in the uppermost *Kamptnerius magnificus* zone, the *Tetralithus aculeus* zone, and the lower *Chiastozygus initialis* zone (Campanian-lower Maestrichtian). The Cusseta Sand lithology, which is considered to be of Campanian age in western Georgia and eastern Alabama, is shown to be basal Ripley or Maestrichtian at this locality, based on the occurrence of *Chiastozygus initialis*. This age difference suggests that the clastic wedge, building southeastward from central Georgia and represented by the Cusseta Sand in east and central Alabama, is time-transgressive as the unit progrades from east to west.

Although a Demopolis Chalk lithology (calcareous clay) appears above the basal Ripley Sand (Cusseta Sand), it is not Campanian as suggested by previous workers, but is instead lower Maestrichtian.

Through the use of planktonic-benthonic foraminiferal ratios, textural analyses, clay mineral ratios, and stratigraphic and biogenic structures, the following 5 sedimentary environments, in vertical sequence, were established: (1) delta-front silts and sands (regressive), (2) offshore clay (transgressive), (3) marginal-shelf sands (basal Ripley), (4) offshore clays (transgressive), and (5) barrier bar-shoal sand complex (regressive).

The gradational boundaries between the various facies produced by a fluctuating strand demonstrates that there is no major break in the sedimentary record in crossing the Campanian-Maestrichtian boundary.

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GULF COAST PHOTOGEOLOGIC APPLICATIONS

The Gulf Coast is an important province for photogeologic applications even though much of it is of low dip and low relief and commonly covered by Pleistocene terrace deposits.

The Gulf Coast is a very active and dynamic province, characterized by clastic sediments that were laid down very rapidly. As a result the sediments are out of equilibrium and considerable compaction and settling have occurred, and many structures have formed. It is this movement and adjustment, acting throughout geologic time, that allow a subsurface structure to continually extend toward the surface, where it can be detected by subtle photogeologic techniques.

Photogeologic or photogeomorphic techniques, including analyses of drainage, topography, vegetation, deposition, and lineation, can definitively locate surface structures. Many of the Gulf Coast oil and gas fields have surface expression. Fields with good expression include those located in areas of current exploration interest, such as Sunniland and Felda in South Florida, Flomaton and Blackjack Creek in the Alabama-Florida Jurassic play, Edgewood and Fruitvale in East Texas, and Big Wells and Los Tiendos in Southwest Texas. Many other fields have good expression including Citronelle, Blacklake, Neale, Reyes, Mathis, and North Government Wells.

Normally, photogeologic interpretation must terminate at the coastlines, but a relatively new sonar-subsea mapping device allows exploration to continue onto the shelf areas. The Institut Français du Pétrole has developed a wide-range scanning sonar that can provide sea-bottom sonar images that rival aerial photographs.

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DISTRIBUTION AND ISOTOPIC COMPOSITION OF URANIUM IN A LOWER SOUTH TEXAS RIVER AND ESTUARY

The uranium concentration and isotopic composition of water and suspended sediment from a South Texas river and estuary were determined by alpha-spectroscopy. The average dissolved uranium concentration and radioactivity ratio (U^{234}/U^{238}) of the river water were determined to be 2.44 ug/l and 1.15, respectively. Water from a tributary of the river was found to contain an average dissolved uranium concentration of 42.8 ug/l with an isotopic radioactivity ratio of 1.56. Close inspection of the lateral concentration and isotopic activity ratio of uranium revealed an increase below the confluence of a tributary and the river. A model was derived based on equations used in isotopic dilution analysis, which predicts these increases within analytical error. This model may be useful in future studies to locate extraneous uranium within the hydrologic environment.

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BOTTOM CHARACTERISTICS OF NORTHERN GULF OF MEXICO CONTINENTAL SHELF

Photographs of the Gulf of Mexico continental shelf floor between Panama City, Florida, and Galveston, Texas, were examined for evidence of sediment texture, structure, and biologic activity. Sediment size is distinctively coarser in areas of reef growth near the continental slope. Bioturbation was recognized by the presence of burrows, mounds, furrows, tracks, and excrements. Water turbidity of varying degrees at times obscured the real water-sediment interface. Current direction and inferred velocity were indicated by compass and sediment cloud. A program of extensive photography, complemented by shallow cores, grab samples, and box samples, is needed to understand fully the different physiographic provinces of the Gulf of Mexico and their local variations.

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USE OF DOWNHOLE GRAVITY DATA IN FORMATION EVALUATION

It has been shown by several workers that the downhole