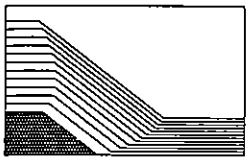
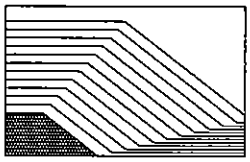
forward modeling should provide a basis for a better understanding of how carbonate platforms evolve, and may eventually lead to a reliable tool for predicting the distribution of facies in carbonate build-ups. As an example, the cartoons below show the effects of supplying a constant volume of sediment to a marginal slope that is increasing in height, while keeping other variables constant. This constraint seems to significantly retard the ability of carbonate platforms to prograde.



supply of constant volume of sediment to slope results in thinner slope facies as slope height increases, retarding progradation



supply of increasing volume of sediment to slope tends to promote progradation

END USER DATABASE SEARCHING IN GEOSCIENCE — № 104435

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Encouraging and training the end user to search databases directly rather than utilizing an information specialist intermediary have become accepted procedures in many institutions. User friendly software, attractive pricing policies, and special training sessions to instruct the novice searcher have fostered this approach. On the other hand, some researchers have questioned the validity of the assumptions that, given the choice, end users (a) prefer to do their own searching and (b) achieve successful results.

This investigation examines the state-of-the-art of end user searching in geoscience. The author contacted a selected sample of geoscience libraries to identify those institutions which offer such programs. Then interviews with both librarians and geoscientists provided information on: (1) the types of end user training available to geoscientists and the extent to which they take advantage of it; (2) the degree to which geoscientists actually do their own searching, as opposed to their requesting searches to be performed by an information specialist; (3) the searching techniques employed by the end user and the perceived success of the results; and (4) geoscientists' views of this endeavor and problems which they have encountered.

The results of the study have implications for end user training programs in science libraries and may provide some interesting contrasts between the geosciences and other scientific disciplines.

PROTEROZOIC GEOLOGY OF THE SOUTHERN MARGIN OF NORTH AMERICA — № 107198

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The early Proterozoic history of southern North America involved accretion of juvenile volcanogenic material southward between 1900 and 1600 m.y. ago and probably involved the development of subduction complexes and outboard arcs against the Archean Superior and Wyoming cratons. Volcanic and plutonic rocks formed during the Penokean Orogeny (1880-1830 m.y. ago) are exposed in the Great Lakes region, whereas those formed 1800-1600 m.y. ago are widely exposed in the western and southwestern US and can be traced eastward beneath Phanerozoic sedimentary rocks as far as central Missouri. Widespread extension and anatectic melting occurred 1480-1340 m.y. ago, forming extensive terranes of rhyolite-dacite and related epizonal granite plutons in the south-central US. About 1200-1000 m.y. ago events of the Grenville and Llano Orogenies caused deformation, high-grade metamorphism, and emplacement of granite and anorthosite in a broad belt across the eastern and southern margins of the continent; rocks of this age and type are also known from Mexico as far south as the Oaxaca region. The nature of this orogenesis is not fully understood; it may have involved continent-continent collision, accretion of arcs, or both. Rocks of late Proterozoic age (600-900 Ma) may occur along the Devils River Uplift in southwestern Texas and at various localities in the Appalachians (e.g. Chillhowee Gp. of Great Smoky Mountains region) but the ages of these rocks are everywhere poorly constrained. A major problem in interpretation of the southern margin of the continent is deep burial by coastal plain sedimentary rocks and paucity of well penetrations into the crystalline rocks

THE TECTONIC STUDIES OF A.J. BULL — № 100292

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A.J. Bull, chemist and engraver by profession, made several profound contributions to tectonics over the period from 1921 to 1950. In his first geologic paper, presented in 1921 at the age of 45, he proposed that subcrustal motion of partially molten rock could lead to the development of mountain chains. In an extended analysis published in 1927, he indicated that a hypothesis of mountain building must explain the origin of horizontal compression and the episodic nature of orogeny and would probably explain the development of rift valleys and other extensional regimes. He explicitly stated that convective motion of an asthenosphere might provide the driving force for mountain building and for Wegener's notion of continental drift. It is clear from his writing that Bull did not fully understand the implications of cellular convection, however.

Bull also included experimental work on folding and contraction in his tectonic studies. He repeated early experiments on structures associated with thermal contraction to demonstrate that the pattern of folds obtained by steady thermal contraction was incompatible with the pattern of mountain belts seen in the earth's crust. He also examined the folds produced in a sliding sheet to analyse structures in the Jura and experimented with the folding of vertically unconfined layers of plasticene to model the folds that would develop in his convection driven tectogenes.

Bull never provided the depth of analysis that other workers did at that time. He was often otherwise occupied by his professional commitments in engraving and photography as well as his other geological work in geomorphology for which he ultimately received the Ph.D. degree. But his tectonic studies are a critical link in the chain of development of the plate tectonic paradigm. Bull provides the source of mechanical concepts that link the work of Joly and Holmes on the thermal state of the earth to Holmes's later convection model.

MAPPING QUATERNARY GEOLOGY IN DISTURBED AREAS -- THE IMPORTANCE OF HISTORICAL SOURCES — № 109603

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Human activity often modifies or destroys salient morphologic expressions of Quaternary geologic processes. Data synthesized from numerous traditional and non-traditional sources enabled this researcher to reconstruct the original topography and geology of urbanized areas.

The Quaternary geology of 4 quadrangles in northwestern Massachusetts was mapped to determine the chronology of deglaciation and to define the glacial lake which occupied the Hoosic River Valley (Lake Bascom). Despite the rugged topography, significant human impact began during the Colonial period. Early observers recorded a dramatically different landscape as the uplands, now heavily forested, were cleared for agriculture. In 1833, Edward Hithchcock completed the Geology of Massachusetts, the first state sponsored geologic survey. Detailed engravings and descriptions, presented as examples of the diluvial theory, illustrate numerous glacial features, some of which are still extant. F. B. Taylor, who mapped Berkshire County glacial geology for the USGS between 1901 and 1916, based many of his conclusions on morphologic expressions, plainly visible because the landscape was not forested. Taylor's unpublished geologic folios, along with material prepared prior to 1930 for historical geology courses at Williams College, suggested additional areas for field investigation. Inspection of older topographic surveys reconciled seemingly implausible Lake Bascom levels identified by Taylor and Cleland. Historic photographs, postcards, and stereo-views were also used to identify now vanished features of the landscape.

Research indicates formerly abundant ice marginal deposits were extensively mined for the sorted sand and gravel they contained. The pattern and chronology of deglaciation proposed for the Hoosic River Valley might have been different had the existence of these deposits not been recognized.

ISOTOPIC Sr AND Nd STUDY OF THE MOGOLLON-DATIL VOLCANIC ROCKS, NEW MEXICO (USA). — № 104245

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The 50,000 km$^2$ Mogollon-Datil volcanic region of southwestern New Mexico was formed by a series of caldera related ashflow eruptions in the Oligocene, and in continuing sporadic volcanic activity to the Pleistocene. Thirty-eight samples were selected for Sr isotopic analyses, and eleven of them were further analysed for Nd isotopic ratios.

The major ashflows sampled and their isotopic results are tabulated below:

| Ashflow | K-Ar date | # of samples | Average Rb/Sr | Average $^{87}Sr/^{86}Sr$ |
|---|---|---|---|---|
| Cooney Tuff | 34 | 2 | 2.52 | .71082 |
| Davis Canyon Tuff | 29.6 | 1 | 3.39 | .70998 |
| Shelley Peak Tuff | 28.5 | 4 | 1.04 | .70860 |
| Bloodgood Canyon Tuff | 28 | 7 | 7.14 | .70932 |

Flow banded rhyolites from two distinct units gave high average Rb/Sr ratios (33.15) and initial ratios (.71785) which can be contrasted to other sialic protrusions which have Rb/Sr ratios ranging from .17 to 13.7 and initial ratios of .70634 to .70997. Miocene andesites and basaltic-andesites sampled had Rb/Sr values under .25 and initial ratios from .70493 for a basaltic-andesite dike to .70961 for an andesite flow.

Nd isotopic values for non-mafic rocks average .51225 and range from .51229 (a protrusive sialic) to .51218 for the Cooney Tuff. The only mafic rock analyzed gave .51251.

The strontium isotopics are consistent with a model of an evolving magma chamber, interacting with existing crust. The Nd isotopics also suggest interaction with an enriched source - possible Precambrian crust as suggested by Pb isotope work (Stacey and Hedlund, 1983). The degree of involvement with this crust does not vary monotonically with time.