gillaceous strata alternate with gray to black, brackish, calcareous-arenaceous-argillaceous strata. The red formations pinch out or change facies toward the north and east in the basin. Marine deposition was continuous from Late Cretaceous to early Tertiary in the eastern part of the basin. A few redbeds grade down depositional dip into gray, marine strata. Red strata have been discovered in the Upper Cretaceous Parras Shale, which normally is a gray to black, calcareous shale, 4,000–5,000 feet thick.

During Paleocene or Eocene time, the sediments of the Parras basin were deformed contemporaneously with the adjacent Sierra Madre Oriental. Deformational intensity in the Lower Cretaceous carbonate rocks of the Sierra Madre appears related to the distribution and thickness of the Minas Viejas (Jurassic?) evaporites. The type and degree of deformation in the Upper Cretaceous Parras basin is not uniform as indicated by the following: (1) overturned folds and imbricate thrusts, which probably do not extend below the Parras Shale, characterize the constricted western part of the basin; (2)broad, elongate, open folds in the southeastern part extend downward to folds in Lower Cretaceous strata; and (3)broad, open, domal folds in the northeast are related to Lower Cretaceous uplifts on the surface and at depth.

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Systematic Interpretation of Unconformities

The term unconformity is applied to first-order discontinuities which bound major continental framework sequences. Regional and interregional identity and continuity of most unconformities have remained unappreciated because: (1) they normally are erased in many areas by later degradation; (2) empirical criteria are inconsistently developed and commonly obscure the unconformities; (3) most empirical criteria do not make it possible to distinguish between unconformities and countless small-magnitude discontinuities; (4) conventional stratigraphy is depositionally, but not degradationally, oriented; (5) unconformably separated sequences commonly are erroneously equated and thus mistakenly interpreted as facies; (6) miscomprehension of the base-level concept has resulted in failure to relate episodically contemporaneous marine, non-marine, and volcanic successions; (7) individual unconformities are too commonly conceived to be of a single type rather than to represent several or all types; (8) diagnostic faunas commonly are absent from critical strata; and (9) many biostratigraphic standards are inadequate to define unconformities.

Failure to recognize these obstacles has led in many cases to the fallacious expedient of interpreting events directly from the unconformity-riddled and thus degradationally fragmented stratal record. As a result, the occurrence of alternating interregional depositional and degradational episodes generally has remained unappreciated, and many conventional interpretations are erroneous.

Because all unconformities have certain phenomena in common, particularly in regard to their manner of development, and because the beds above and below an unconformity repeatedly have certain relations to one another and to the unconformity separating them, certain axioms and corollaries can be stated that apply specifically to unconformities. It is believed that analytical procedures devised and carried out in the light of these axioms and corollaries provide a systematic basis for the interpretation of unconformities and for their distinction from the myriads of minor breaks.

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Quantitative Approach to Nature and Areal Variability of Fold Geometry

For describing variations of fold style, orientation, and location, quantitative scalar variables are preferred to quantitative vectoral or qualitative attributes. T. V. Loudon showed that useful quantitative data are obtained if fold profiles are subdivided into one-wavelength units, and if the inclinations (Θ), from the principal axes, or normals to the folded surfaces are measured; the orthogonal principal axes are defined first by factor analysis. The first four statistical moments of these $\cos \Theta$ values provide scalar descriptors of mean slope, tightness, asymmetry, and shape, respectively. Additional scalars include direction cosines of the principal axes, kurtosis and skewness of the $\cos \Theta$ values, and the ratio of profile length to wave length.

Vectoral fold attributes plotted on Schmidt equal-area projections necessarily divorce measurements from geographical locations. Scallars facilitate the drawing of contour maps of the areal variability of fold geometry. Surface-trend analyses, widely used in stratigraphic and petrographic research, are used to illustrate regional changes in fold terranes.

Scalar descriptors are useful also in sequential, multivariate regression analyses to search for those geologic factors that controlled the nature and regional variability of folds. Such methods have potential in analyzing subsurface folds for water or petroleum-resource studies. Examples are based on correlations of regional fold patterns with (a) variations of member thickness, lithology, cementation, stratigraphy, *etc.* and (b) proximity to major tectonic features. Such methods are valuable for prediction and permit quantitative testing of hypotheses, *e.g.*, that fold styles in an area (a) change progressively with metamorphic grade or (b) are dissimilar in sandstone and limestone.

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Problems in Biostratigraphy and Taxonomy of Middle Liassic Ammonites of Alpine-Mediterranean Province

The zonation of the Lias (Lower Jurassic) of the Northwest European ammonite province has been worked out in great detail and is based on very careful collecting from representative sections. It recently has been summarized thoroughly by Dean, Donavon, and Howarth (1961). In contrast, the zonation of the Pliensbachian Stage in the Alpine-Mediterranean province still is inadequate, despite extensive descriptive literature. There are several reasons for this.

1. Authors of ammonite monographs usually do not take into account the distinctive character of this faunal province, which requires zonation of its own, based on indigenous index forms. Efforts to correlate these assemblages with the classic zones established in Germany and England have led mostly to confusion.

2. During the Early Jurassic, most of the Alpine-Mediterranean province was undergoing a rapid and complex change of paleogeographic pattern, reflected in extreme heteropic differentiation. This process,