GLOSSARY—STRIKE-SLIP DEFORMATION, BASIN FORMATION, AND SEDIMENTATION[1]

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INTRODUCTION

Many of the geological terms having to do with strike-slip deformation, basin formation, and sedimentation are used in a variety of ways by different authors (e.g., pull-apart basin), or they are synonymous with other words (e.g., left-lateral, sinistral). Rather than enforcing a rigorously uniform terminology in this book, we decided to set down our preferred definitions in a glossary, and where appropriate to indicate alternative usage. In selecting terms for definition, we have tried to steer a course between being overly encyclopedic and providing a list useful to those having little familiarity with the geology of strike-slip basins, especially those described in this volume. Some words (e.g., cycle) have additional meanings in the geological sciences not included here, and this glossary should therefore be used in the context of strike-slip basins. The references cited are those from which we obtained definitions, or which illustrate the concept embodied by a particular term. We have not attempted to provide original references for every term, especially for those long used in the geological literature.

THE GLOSSARY

Anastomosing—Pertaining to a network of branching and rejoining surfaces or surface traces. Commonly used to describe braided fault systems.

Antithetic fault—Originally defined by H. Cloos (1928, 1936) to describe faults that dip in a direction opposite to the dip of the rocks displaced, and that rotate fault-bounded blocks so that the net slip on each fault is greater than it would be without rotation (Dennis, 1967, p. 3). Many authors now use the term to describe faults that (1) are subsidiary to a major fault and have less displacement than that fault, (2) formed in the same stress regime as the major fault with which they are associated, (3) are oriented at a high angle to the major fault (in map view for strike-slip faults, in cross-sectional view for normal faults), and (4) for strike-slip faults, have a sense of displacement opposite that of the major fault, or for normal faults, dip in the opposite direction. Antithetic strike-up faults compose the R′ set of Reidel shears formed in simple shear (Fig. 1).

Aulacogen—A term introduced by Shatski (1946a, b) to describe narrow, elongate sedimentary basins that extend into cratons from either a geosyncline or a mountain belt that formed from a geosyncline (for a discussion of genesis in terms of plate tectonics, see Hoffman et al., 1974).

Basin—(1) A site of pronounced sediment accumulation; (2) a relatively thick accumulation of sedimentary rock (for a discussion of the history and usage of the word, see Dennis, 1967, p. 9; Bates and Jackson, 1980, p. 55).

Bubnoff curve—A plot of subsidence versus time (Fischer, 1974).

Bubnoff unit—A standard measure of geologic rates, such as subsidence rates, defined as 1 m/m.y. (Fischer, 1969; Bates and Jackson, 1980, p. 84).

Burial history curve—A plot, for a given location, of the cumulative thickness of sediments overlying a surface versus time (Philipp, 1961; van Hinte, 1978).

Closing bend—See restraining bend.

Compaction—(1) The reduction in bulk volume or thickness of, or the pore space within, a body of sediment in response to the increasing weight of a superimposed load; (2) the physical process by which fine-grained sediment is converted to consolidated rock (modified from Bates and Jackson, 1980, p. 127).

Compression—(1) A system of stresses that tends to shorten or decrease the volume of a substance (preferred definition, modified from Bates and Jackson, 1980, p. 130). Uniaxial compression involves one nonzero principal stress, which is compressive; in triaxial compression, all three principal stresses are nonzero (Means, 1976, p. 80). It is also possible for a compressive principal stress to occur with one or more tensile principal stresses. (2) A state of strain in which material lines become shorter under compressive stress (J. T. Engelder, personal commun., 1985; Aydin and Nur, 1985 this volume; see contraction).

Compressional bend—See restraining bend.

Compressional overstep—See restraining overstep.

Conjugate Riedel shear—Synonymous with R′ Riedel or antithetic shear (Fig. 1). See Riedel shear, synthetic and antithetic faults.

Contraction—A strain involving (1) a reduction in volume (e.g., thermal contraction), or (2) a reduction of length (e.g., contraction fault of Norris, 1958; McClay, 1981). Contraction has been gaining popularity as the general strain term associated with compressive stress, much like the relationship between the stress term tension and the strain

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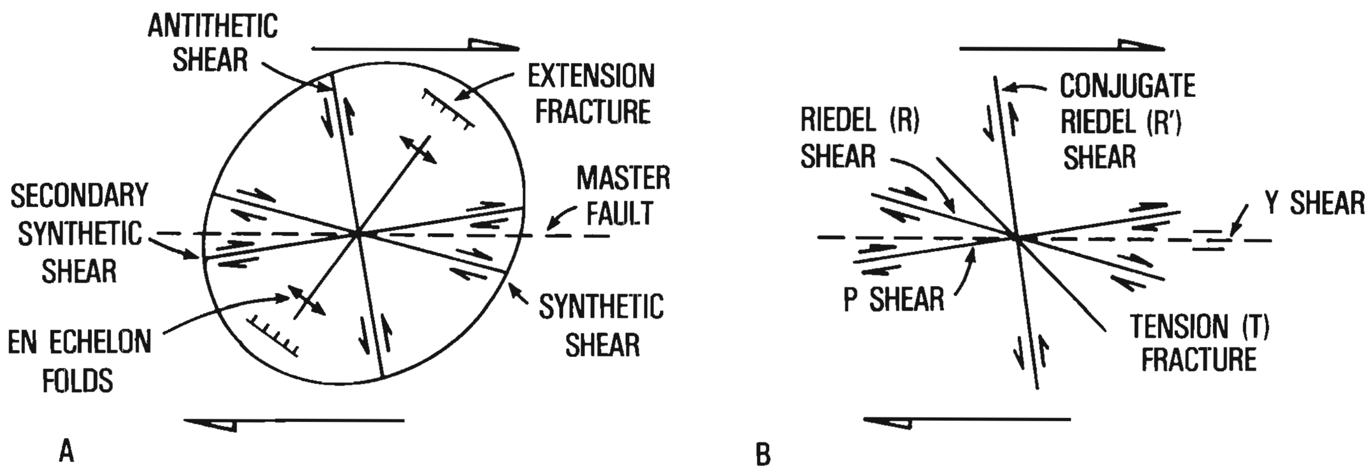

FIG. 1.—The angular relations between structures that tend to form in right-lateral simple shear under ideal conditions, compiled from clay-cake models and from geological examples. Arrangements for structures along left-slip faults may be determined by viewing the figure in reverse image. A) Terminology largely from Wilcox et al. (1973), superimposed on a strain ellipse for the overall deformation. B) Riedel shear terminology, modified from Tchalenko and Ambraseys (1970) and Bartlett et al. (1981). See glossary for definitions of terms.

term extension. The word shortening, as used by Hobbs et al. (1976, p. 27), may be a better choice for general use because it does not imply a volume change.

Convergent bend—A bend in a strike-slip fault that results in overall crustal shortening in the vicinity of the bend (synonymous with restraining bend of Crowell, 1974a).

Convergent overstep—See restraining overstep.

Convergent (transpressional) strike-slip or wrench fault—A strike-slip or wrench fault along which strike-slip deformation is accompanied by a component of shortening transverse to the fault (Wilcox et al., 1973).

Cycle—(1) An interval of time during which one series of recurrent events is completed (preferred definition); (2) a sequence of sediment or rock units repeated in a succession (for additional discussion, see Bates and Jackson, 1980, p. 156).

Depositional sequence—A stratigraphic unit composed of a relatively conformable succession of genetically related strata and bounded at its top and base by unconformities or their correlative conformities (Mitchum, 1977, p. 206).

Dextral—Pertaining to the right (e.g., dextral slip is right slip).

Dip—The acute angle between an inclined surface and the horizontal, measured in a vertical plane perpendicular to strike.

Dip separation—Separation measured parallel to the dip of a fault (modified from Crowell, 1959, p. 2662; Bates and Jackson, 1980, p. 177). See separation.

Dip slip—The component of slip measured parallel to the dip of a fault (Crowell, 1959, p. 2655; Bates and Jackson, 1980, p. 177). See slip.

Dip-slip fault—A fault along which most of the displacement is accomplished by dip slip (modified from Bates and Jackson, 1980, p. 177).

Divergent bend—A bend in a strike-slip fault that results in overall crustal extension in the vicinity of the bend (synonymous with releasing bend of Crowell, 1974a).

Divergent overstep—See releasing overstep.

Divergent (transtensional) strike-slip or wrench fault—A strike-slip or wrench fault along which strike-slip deformation is accompanied by a component of extension transverse to the fault (Wilcox et al., 1973; Harding et al., 1985 this volume).

Downlap—A base-discordant relation in which initially inclined strata terminate downdip against an initially horizontal or inclined surface (Mitchum, 1977, p. 206).

Drag fold—(1) A fold produced by movement along a fault (see normal drag and reverse drag). In this context, the term is somewhat misleading because folding commonly initiates before faulting (Hobbs et al., 1976, p. 306). (2) A minor fold formed in a less competent bed between more competent beds by movement of the competent beds in opposite directions relative to one another (Bates and Jackson, 1980, p. 186).

Drape fold—A fold in a sedimentary layer that conforms passively to the configuration of underlying structures (Friedman et al., 1976, p. 1049). A fold formed by differential compaction is an example of a drape fold.

Dynamic analysis—The study of kinematics and kinetics that relates strains to the evolution of stress fields.

Echelon—Step (e.g., echelon faults of Clayton, 1966, and of Segall and Pollard, 1980, meaning overstepping faults).

En echelon—(1) A stepped arrangement of relatively short, consistently overlapping or underlapping structural elements such as faults or folds that are approximately parallel to each other but oblique to the linear or relatively narrow zone in which they occur (preferred definition, modified from Campbell, 1958; Harding and Lowell, 1979; see Fig. 2). En echelon arrangements can occur in both map view and cross section (Shelton, 1984; Aydin and Nur, 1985 this volume). (2) Any stepped arrangement of two or more overlapping or underlapping structural elements such as faults or folds that are approximately parallel to each other and to the zone in which they occur, without reference to whether the sense of overstep is consistent or inconsistent (e.g., for strike-slip deformation, D. A. Rodgers, 1980; Aydin and Nur, 1985 this volume; for thrust and fold belts, J. Rodgers, 1963; Armstrong, 1968; Dahlstrom, 1970). See oblique, relay pattern.

Extension—A strain involving an increase in length.

Extension fault—A fault that results in lengthening of an arbitrary datum, commonly but not necessarily bedding (synonymous with one usage of normal fault; Suppe 1985, p. 269). The term may be applied to faults of any dip (Christie-Blick, 1983).

Extension fracture—A mode I crack, or one that shows no motion in the plane of the crack (Lawn and Wilshaw, 1975, p. 52; J. T. Engelder, personal commun., 1985). Extension fractures form when effective stresses are tensile (i.e., when pore-fluid pressure exceeds lithostatic pressure). Partly synonymous with T fracture of Tchalenko and Ambraseys (1970). See tension fracture. In strike-slip systems, extension fractures and tension fractures form in response to simple shear at about 45° to the master fault (Fig. 1).

Extensional bend—See releasing bend.

Extensional overstep—See releasing overstep.

External rotation—A change in the orientation of structural features during deformation with reference to coor-

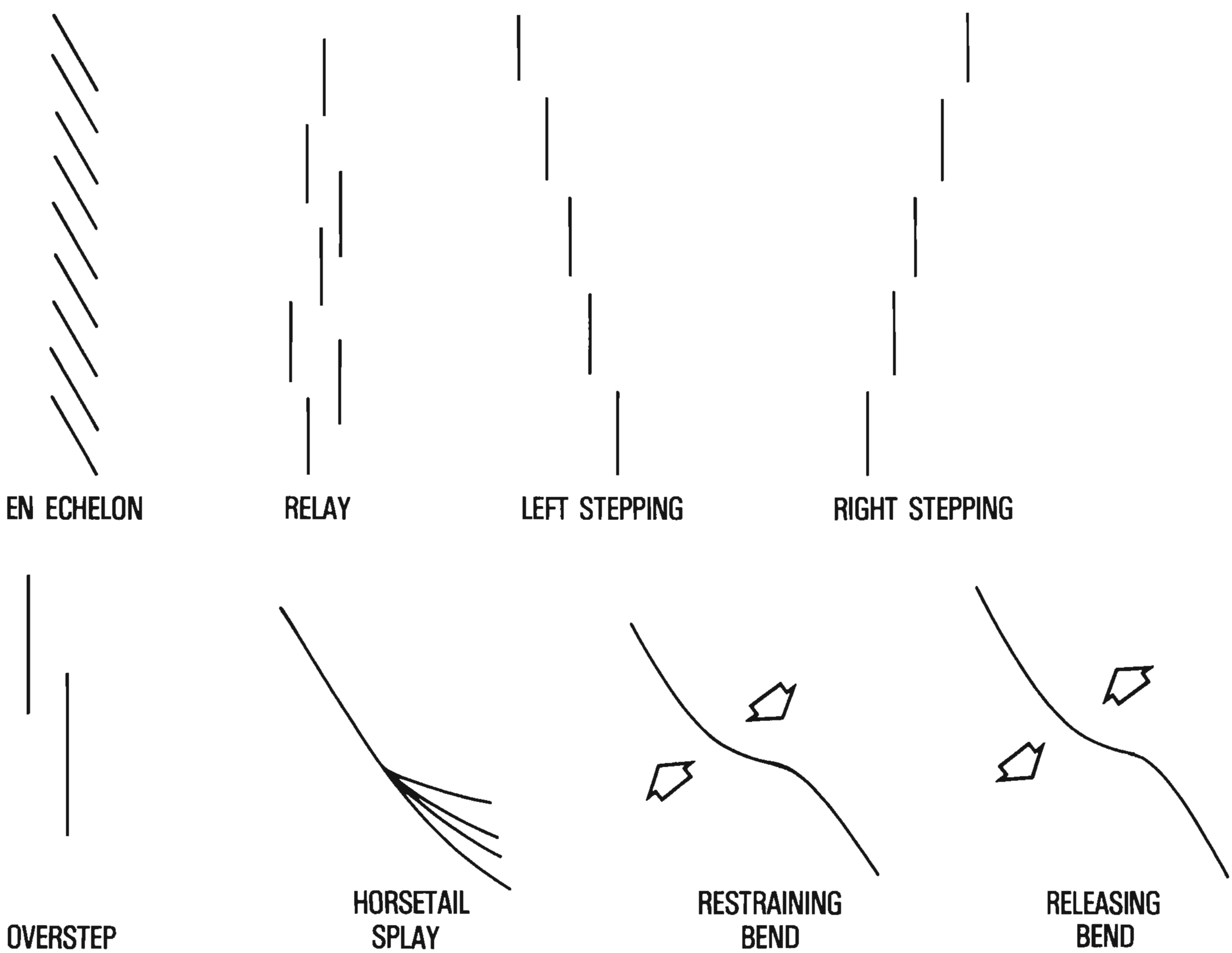

FIG. 2.—Some simple structural patterns.

dinate axes external to the deformed body (Bates and Jackson, 1980, p. 218).

Facies—(1) Laterally or sequentially associated bodies of sediment or sedimentary rock distinguished on the basis of objective lithologic and paleontologic characteristics that reflect the processes and environments of deposition and/or diagenesis; (2) distinctive, adjacent, coeval rock units (White, 1980); (3) the lithologic and paleontologic characteristics of a body of sediment or sedimentary rock that reflect the processes and environments of deposition (original sense of Gressly, 1838). See Walker (1984) for further discussion and references to numerous reviews.

Fault-angle depression—A subsiding depression parallel to the trace of an oblique-slip fault (Ballance, 1980, p. 232).

Fault-flank depression—A depression between subsidiary folds of a strike-slip fault system (Crowell, 1976).

Fault-slice ridge—A linear topographic high associated with a fault-bounded uplifted block within a fault zone (Crowell, 1974b; synonymous with pressure ridge).

Fault splay—A subsidiary fault that merges with and is genetically related to a more prominent fault. Fault splays are common near the termination of a major strike-slip fault (Fig. 2), unless this is at an intersection with another strike-slip fault.

Fault strand—An individual fault of a set of closely spaced, parallel or subparallel faults of a fault system.

Fault-wedge basin—A basin formed by extension at a releasing junction between two predominantly strike-slip faults having the same sense of offset (Crowell, 1974a; synonymous with wedge graben of Freund, 1982). See releasing fault junction.

Flexure—(1) A fold produced by a force couple applied parallel to the direction of deflection (Suppe, 1985, p. 360); (2) a mechanism of regional isostatic compensation in which loads are supported by broad deflection of the lithosphere as a result of lithospheric rigidity (Watts and Ryan, 1976; Watts, 1983; M. S. Steckler, personal commun., 1985).

Flower structure—An array of upward-diverging fault splays within a strike-slip zone (attributed to R. F. Gregory by Harding and Lowell, 1979; see positive flower structure and negative flower structure; synonymous with palm-tree structure of Sylvester, 1984, but preferred for reasons of precedence).

Forced fold—A fold whose overall shape and trend are dominated by the shape and trend of an underlying forcing member (Stearns, 1978).

Foreland—A more-or-less stable area underlain by continental crust, and adjacent to an orogenic belt, toward which rocks of the belt were tectonically transported (Bates and Jackson, 1980, p.241).

Fracture zone—An extension of a transform fault beyond its intersection with an oceanic ridge. Fracture zones are characterized by dip slip, especially where juxtaposed oceanic crust is of markedly different age, and usually they do not experience strike slip (see Freund, 1974; Fox and Gallo, 1984).

Graben—An elongate, relatively depressed block bounded by normal faults (Bates and Jackson, 1980, p. 268).

Heat flow—The product of a thermal gradient and the thermal conductivity of the material across which the thermal gradient is measured.

Horsetail splay—One of a set of curved fault splays near the end of a strike-slip fault that merge with that fault. The set forms an array that crudely resembles a horse's tail (Figs. 2, 3).

Internal rotation—A change in the orientation of structural features during deformation with reference to coordinate axes internal to the deformed body (Bates and Jackson, 1980, p. 322).

Kinematic analysis—The analysis of a movement pattern based on displacement without reference to force or stress (modified from Spencer, 1977, p. 39).

Leaky transform—A transform plate boundary characterized by significant volcanism and/or intrusion along its length. See Garfunkel (1981) for a continental example. See transform fault, transform margin.

Left-hand overstep or stepover—An overstep (stepover) in which one fault or fold segment occurs to the left of the adjacent segment from which it is being viewed (Campbell, 1958; Wilcox et al., 1973). See left-stepping, overstep, stepover. For oversteps in cross section, it is necessary to specify the direction from which the overstep is being viewed.

Left-lateral—Refers to an offset along a fault in map view, in which the far side is apparently displaced to the left with respect to the near side.

Left separation—Strike separation in which the far side of a fault is apparently displaced to the left with respect to the near side. See separation, strike separation.

Left slip—The component of slip measured parallel to the strike of a fault in which the far side of the fault is displaced to the left with respect to the near side. See slip.

Left-stepping—Refers to an overstep in which one fault or fold segment occurs to the left of the adjacent segment from which it is being viewed (Fig. 2). See left-hand overstep.

Lineament—A linear topographic feature of regional extent that is thought to reflect crustal structure (Hobbs et al., 1976, p. 267).

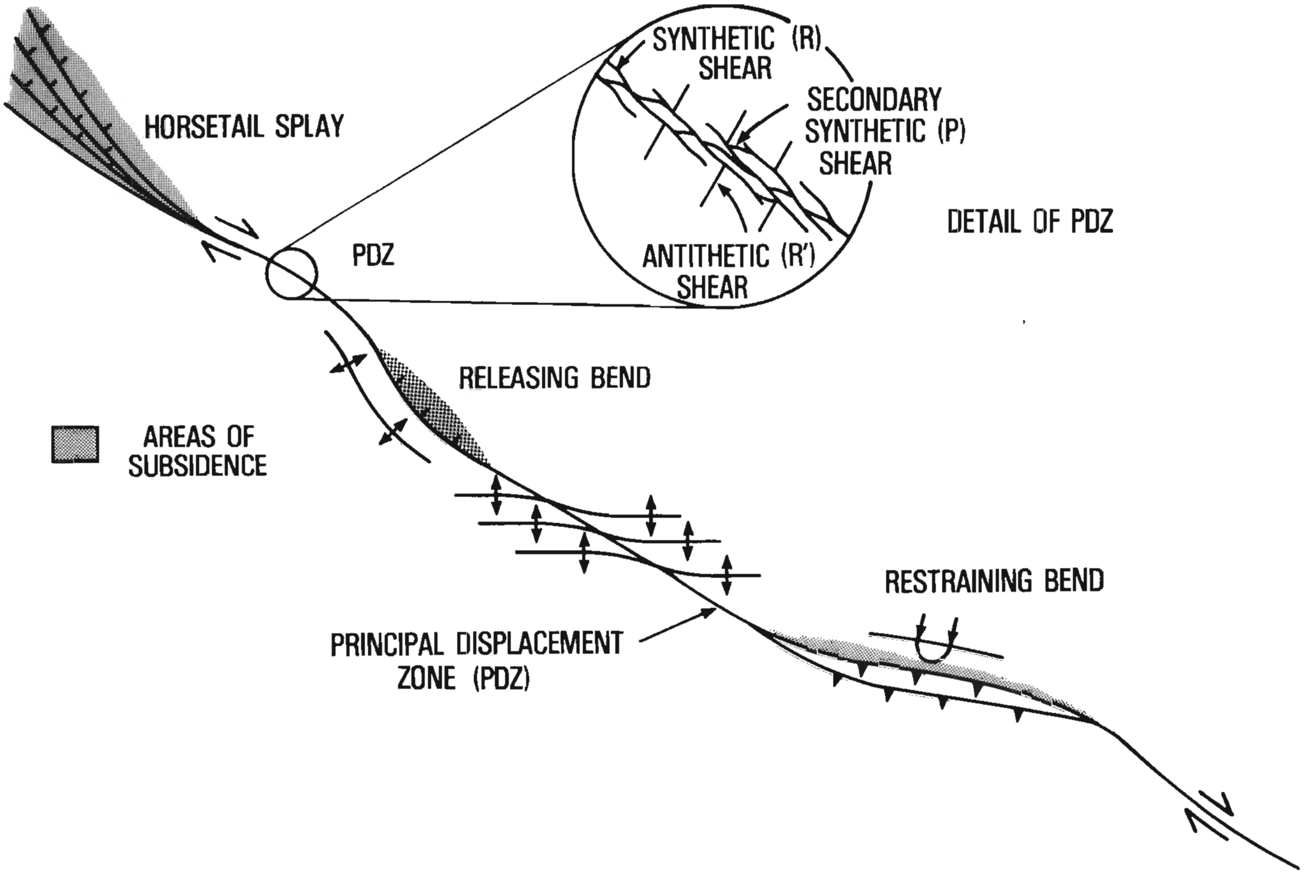

FIG. 3.—The spatial arrangement, in map view, of structures associated with an idealized right-slip fault. See glossary for definitions of terms.

Listric fault—A curved, generally concave-upward, downward-flattening fault (see Bally et al., 1981). Listric faults may be characterized by normal or reverse separation.

Lithosphere—The outer shell of the Earth consisting of crust and upper mantle, and characterized by strength relative to the underlying asthenosphere for deformation at geologic rates (Bates and Jackson, 1980, p. 364; Watts, 1983). The base of the lithosphere can be defined by a number of different properties that reflect rheology, such as temperature, seismic velocity and degree of seismic attenuation.

Marginal basin—A semi-isolated basin lying behind the volcanic chain of an island arc system (Karig, 1971, p. 2542).

Master fault—A major fault in a fault system (Wilcox et al., 1973; Rodgers, 1980; nearly synonymous with principal displacement zone of Tchalenko and Ambraseys, 1970).

Megashear—A strike-slip fault with horizontal displacement that significantly exceeds the thickness of the crust (Carey, 1958, 1976, p. 85).

Multiple overstep—A series of discontinuities between approximately parallel overlapping or underlapping strike-slip faults (new term). See overstep, overlap, and underlapping faults.

Negative flower structure—A flower structure in which the upward-diverging fault splays are predominantly of normal separation and commonly associated with a prominent synformal structure or structures in strata above, or cut by, the faults (Harding, 1983, 1985; Harding et al., 1985 this volume). See flower structure.

Net slip—The displacement vector connecting formerly adjacent points on opposite sides of a fault (modified from Hobbs et al., 1976, p. 300).

Normal drag—Folding near a fault resulting from resistance to slip along the fault. Folded strata are convex toward the slip direction on both sides of the fault. See drag fold.

Normal fault—(1) A fault with normal separation across which the hanging wall is apparently lowered with respect to the footwall (preferred definition; Hill, 1959); (2) a fault generated by normal slip (see Gill, 1941, 1971). The term may be applied to faults of any dip (Christie-Blick, 1983).

Normal separation—Separation measured parallel to the dip of a fault across which the hanging wall is apparently lowered with respect to the footwall. See separation.

Normal slip—The component of slip measured parallel to the dip of a fault across which the hanging wall is lowered with respect to the footwall. See slip.

Oblique—Not parallel; intersecting at an acute angle. En echelon elements are oblique to the zone in which they occur, but not all oblique elements are en echelon. See en echelon.

Oblique slip—The relative displacement of formerly adjacent points on opposite sides of a fault, involving components of both dip slip and strike slip. See slip, dip slip, strike slip.

Oblique-slip fault—A fault along which displacement is accomplished by a combination of strike slip and dip slip. See slip-oblique fault.

Oblique subduction—The relative displacement of one lithospheric plate beneath another plate such that in map view the displacement vector is oblique to the plate boundary.

Onlap—A base-discordant stratigraphic relation in which initially horizontal or inclined strata terminate updip against an initially inclined surface (modified from Mitchum, 1977, p. 208).

Opening bend—See releasing bend.

Orogeny—Profound deformation of rock bodies along restricted zones and within a limited time interval (Dennis, 1967, p. 112).

Overlap—(1) The distance between the ends of overlapping parallel faults, measured parallel to the faults (Rodgers, 1980; Mann et al., 1983; Aydin and Nur, 1985 this volume; generally applied to strike-slip faults in map view; nearly synonymous with separation of Segall and Pollard, 1980); (2) a relation between two superimposed stratigraphic units onlapping a given surface, in which the upper unit extends beyond the line of pinch-out in the lower unit.

Overstep—(1) a discontinuity between two approximately parallel overlapping or underlapping faults (Fig. 2; synonymous with stepover of Aydin and Nur, 1982a, b; 1985 this volume). Oversteps can occur in both map view and cross section, and on both strike-slip and dip-slip faults (Aydin and Nur, 1985 this volume), but the term is commonly applied to strike-slip faults in map view. See solitary overstep, multiple overstep, releasing overstep, and restraining overstep. (2) A stratigraphic relation in which one or more stratigraphic units unconformably overlie the eroded edge of older, generally tilted or folded sedimentary rocks.

Palm-tree structure—An array of upward-diverging fault splays within a strike-slip zone (nomenclature of A. G. Sylvester and R. R. Smith; Sylvester, 1984; synonymous with flower structure of Harding and Lowell, 1979, a term that has precedence).

P shear—One of a set of faults that develop in simple shear generally after the formation of Riedel shears. P shears have the same sense of displacement as Riedel R shears, and form at an angle to the principal displacement zone that is of about the same magnitude but of opposite sign (Skempton, 1966; Tchalenko and Ambraseys, 1970; Figs. 1, 3). Synonymous with secondary synthetic strike-slip fault.

Piercing points—The points of intersection of formerly contiguous linear features (real or constructed) on opposite sides of a fault, by means of which net slip on the fault may be determined (Crowell, 1959, p. 2656). Examples of such linear features are the pinchout line of a sedimentary wedge, offset streams, and facies boundaries used in conjunction with structure contours.

Plunge—The acute angle between an inclined line and the horizontal, measured in a vertical plane containing the line.

Pop-up—A relatively uplifted block between thrusts verging in opposite directions. Originally applied to structures in thrust and fold belts (Butler, 1982).

Positive flower structure—A flower structure in which the upward-diverging fault splays are predominantly of reverse separation and commonly associated with a prominent antiformal structure or structures in strata above, or cut by, the faults (Harding et al., 1983; Harding, 1985). See flower structure.

Pressure ridge—A linear topographic high associated with a fault-bounded uplifted block within a fault zone (Tchalenko and Ambraseys, 1970; synonymous with fault-slice ridge).

Principal displacement zone—A relatively narrow zone that accounts for most of the slip on a given fault (Tchalenko and Ambraseys, 1970, p. 43; Fig. 3). See master fault.

Progradation—The outward building of sediment in the direction of transport, generally, but not exclusively, from a shoreline toward a body of water.

Pull-apart basin—(1) A basin formed by crustal extension at a releasing bend or releasing overstep along a strike-slip fault zone (preferred definition; Burchfiel and Stewart, 1966; Crowell, 1974b; Mann et al., 1983; nearly synonymous with rhomb graben); (2) any basin resulting from crustal extension (Klemme, 1980; Bois et al., 1982).

Pure shear—A homogeneous deformation involving either a plane strain or a general strain in which lines of particles that are parallel to the principal axes of the strain ellipsoid have the same orientation before and after deformation (Hobbs et al., 1976, p. 28). Also referred to as an irrotational deformation or strain. See shear, simple shear.

Push-up—A block elevated by crustal shortening at a restraining bend or restraining overstep along a strike-slip fault zone (Aydin and Nur, 1982a; Mann et al., 1983). See rhomb horst.

Ramp valley—A topographic basin bounded by reverse faults (Willis, 1928, p. 493; Burke et al., 1982). Not all ramp valleys are related to strike-slip deformation.

Regression—A seaward retreat of a shoreline, generally expressed as a seaward migration of shallow-marine facies (modified from Mitchum, 1977, p. 209).

Relay pattern—A shingled arrangement of inconsistently overlapping or underlapping structural elements such as faults or folds that are approximately parallel to each other and to the elongate zone in which they occur (modified from Harding and Lowell, 1979; Fig. 2). Many authors do not distinguish between en echelon and relay arrangements. See Christie-Blick and Biddle (1985 this volume).

Releasing bend—A bend in a strike-slip fault associated with overall crustal extension in the vicinity of the bend (Figs. 2, 3; Crowell, 1974a; synonymous with divergent bend).

Releasing fault junction—A junction between two strike-slip faults associated with overall crustal extension and basin formation between the faults (Christie-Blick and Biddle, 1985 this volume). See fault-wedge basin, wedge graben.

Releasing overstep—A right overstep between right-slip faults or a left overstep between left-slip faults associated with overall crustal extension and basin formation between the faults (Christie-Blick and Biddle, 1985 this volume).

Restraining bend—A bend in a strike-slip fault associated with overall crustal shortening and uplift in the vicinity of the bend (Figs. 2, 3; Crowell, 1974a; synonymous with convergent bend).

Restraining fault junction—A junction between two strike-slip faults associated with overall crustal shortening and uplift between the faults (Christie-Blick and Biddle, 1985 this volume).

Restraining overstep—A right overstep between left-slip faults or a left overstep between right-slip faults associated with overall crustal shortening and uplift between the faults (Christie-Blick and Biddle, 1985 this volume).

Retrogradation—The landward backstepping of sedimentary units usually but not exclusively from a shoreline, as expressed by a landward migration of facies belts.

Reverse drag—Deformation along a fault that creates a fold or set of folds whose curvature is opposite that which would be formed by normal drag folding. Reverse drag is a common feature of listric normal faults where hanging-wall folds are concave toward the slip direction.

Reverse fault—(1) A fault with reverse separation across which the hanging wall is apparently elevated with respect to the footwall (preferred definition; Hill, 1959); (2) a fault generated by reverse slip (see Gill, 1941, 1971). The term may be applied to faults of any dip (Christie-Blick, 1983).

Reverse separation—Separation measured parallel to the dip of a fault across which the hanging wall is apparently elevated with respect to the footwall. See separation.

Reverse slip—The component of slip measured parallel to the dip of a fault across which the hanging wall is elevated with respect to the footwall. See slip.

Rhombochasm—A parallel-sided gap in sialic (continental) crust occupied by simatic (oceanic) crust (modified from Carey, 1976, p. 81). One of S. W. Carey's type examples is the Gulf of California. For original definition and discussion, see Carey (1958).

Rhomb graben—A basin formed by crustal extension at a releasing bend or releasing overstep in a strike-slip fault zone (Freund, 1971; Aydin and Nur, 1982b; synonymous with pull-apart basin of Burchfiel and Stewart, 1966, and Crowell, 1974a, b, particularly sharp pull-aparts, or ones that are angular in map view).

Rhomb horst—A block elevated by crustal shortening at a restraining bend or restraining overstep in a strike-slip fault zone (Aydin and Nur, 1982b; nearly synonymous with push-up of Aydin and Nur, 1982a, and Mann et al., 1983, particularly those that are angular in map view).

Riedel shear—In simple shear, two sets of shear fractures tend to form, oriented at $\phi/2$ and $90°-\phi/2$ to the principal displacement zone (where ϕ is the internal coefficient of friction commonly taken to be about 30°). Shear fractures oriented at $\phi/2$ are called R shears whereas those formed at $90°-\phi/2$ are termed R′ shears (modified from Tchalenko and Ambraseys, 1970). See synthetic and antithetic faults (Figs. 1, 3).

Right-hand overstep or stepover—An overstep (stepover) in which one fault or fold segment occurs to the right of the adjacent segment from which it is being viewed (Campbell, 1958; Wilcox et al., 1973). See right-stepping, overstep, stepover. For oversteps in cross section, it is necessary to specify the direction from which the overstep is being viewed.

Right-lateral—Refers to an offset along a fault in map view, in which the far side is apparently displaced to the right with respect to the near side.

Right separation—Strike separation in which the far side of a fault is apparently displaced to the right with respect to the near side. See separation, strike separation.

Right slip—The component of slip measured parallel to the strike of a fault in which the far side of the fault is displaced to the right with respect to the near side. See slip.

Right-stepping—Refers to an overstep in which one fault or fold segment occurs to the right of the adjacent segment from which it is being viewed (Fig. 2). See right-hand overstep.

Rotation—Motion in which the path of a point in the moving object defines an arc around a specified axis.

Rotational strain—Strain in which the orientation of the strain axes is different before and after deformation (Bates and Jackson, 1980, p. 546). See simple shear.

Secondary synthetic fault—One of a set of faults that develop in simple shear, generally after the formation of synthetic faults (Riedel shears). Secondary synthetic faults have the same sense of displacement as the synthetic faults and form an angle to the principal displacement zone that is of about the same magnitude as the synthetic faults but of opposite sign (Figs. 1, 3). Synonymous with P shear. See synthetic and antithetic fault, Riedel shear.

Separation—(1) The apparent displacement of formerly contiguous surfaces on opposite sides of a fault, measured in any given direction (modified from Reid et al., 1913, p. 169; Crowell, 1959, p. 2661); (2) the perpendicular distance between overlapping parallel strike-slip faults (Rodgers, 1980; Mann et al., 1983; Aydin and Nur, 1985 this volume); (3) the distance between overstepping parallel strike-slip faults (either overlapping or underlapping), measured parallel to the faults (Segall and Pollard, 1980; nearly synonymous with overlap of Rodgers, 1980).

Shear—A strain resulting from stresses that cause, or tend to cause, parts of a body to move relatively to each other in a direction parallel to their plane of contact (modified from Bates and Jackson, 1980, p. 575). See pure shear, simple shear.

Simple shear—A constant volume, homogeneous deformation involving plane strain, in which a single family of parallel material planes is undistorted in the deformed state and parallel to the same family of planes in the undeformed state (Hobbs et al., 1976, p. 29). Also referred to as a rotational deformation or strain. See shear, pure shear.

Simple strike-slip or wrench fault—A strike-slip or wrench fault along which adjacent blocks move laterally with no component of shortening or extension transverse to the fault (Christie-Blick and Biddle, 1985 this volume; synonymous with simple parallel strike-slip or wrench fault of Wilcox et al., 1973; and with slip-parallel fault of Mann et al., 1983).

Sinistral—Pertaining to the left (e.g., sinistral slip is left slip).

Slickenside—A polished or smoothly striated surface on either side of a fault that results from motion along the fault (Bates and Jackson, 1980, p. 587).

Slip—The relative displacement of formerly adjacent points on opposite sides of a fault measured along the fault surface (modified from Reid et al., 1913, p. 168; Crowell, 1959, p. 2655).

Slip-oblique fault—A strike-slip fault along which strike-slip deformation is accompanied by a component of either shortening or extension transverse to the fault (Mann et al., 1983; includes convergent and divergent strike-slip or wrench faults of Wilcox et al., 1973; and transpressional and transtensional faults of Harland, 1971; nearly synonymous with oblique-slip fault).

Slip-parallel fault—A fault that strikes parallel to the azimuth of the slip direction (Mann et al., 1983; synonymous with simple parallel strike-slip or wrench fault of Wilcox et al., 1973; and with simple strike-slip fault of Christie-Blick and Biddle, 1985 this volume).

Solitary overstep—An isolated discontinuity, between two approximately parallel overlapping or underlapping faults (Guiraud and Seguret, 1985 this volume; Fig. 2).

Sphenochasm—A triangular gap of oceanic crust separating two continental blocks with fault margins converging to a point, and interpreted as having originated by the rotation of one block with respect to the other (modified from Carey, 1976, p. 81). The Bay of Biscay is one of S. W. Carey's examples of a sphenochasm. See Carey (1958) for original definition.

Splay—Generally synonymous with fault splay, a subsidiary fault that merges with, and is genetically related to, a more prominent fault.

Stepover—A discontinuity between two approximately parallel overlapping or underlapping faults (Aydin and Nur, 1982a, b; 1985 this volume; Aydin and Page, 1984; synonymous with overstep). Stepovers can occur in both map view and cross section, and on both strike-slip and dip-slip faults (Aydin and Nur, 1985 this volume), but the term is commonly applied to discontinuities on strike-slip faults in map view.

Stratigraphic separation—The stratigraphic thickness either cut out or repeated by a fault (modified from Crowell, 1959, p. 2663).

Strand—See fault strand.

Strike—The azimuth of the line of intersection of an inclined surface with a horizontal plane.

Strike separation—Separation measured parallel to the strike of a fault (modified from Crowell, 1959, p. 2662; Bates and Jackson, 1980, p. 618). See separation.

Strike slip—The component of slip measured parallel to the strike of a fault (Crowell, 1959, p. 2655; Bates and Jackson, 1980, p. 618). See slip.

Strike-slip fault—A fault along which most of the displacement is accomplished by strike slip (modified from Bates and Jackson, 1980, p. 618).

Strike-slip basin—Any basin in which sedimentation is accompanied by significant strike slip (modified from Mann et al., 1983).

Subsidence—The depression of an area of the Earth's crust with respect to surrounding areas.

Synthetic fault—Originally defined by H. Cloos (1928, 1936) to describe faults that dip in the same direction as the rocks displaced and that rotate fault-bounded blocks so that the net slip on each fault is less than it would be without rotation (Dennis, 1967, p. 148–149). Many authors now use the term to describe faults that (1) are subsidiary to a major fault and have less displacement than that fault; (2) formed in the same stress regime as the major fault with which they are associated; (3) are oriented at a low angle to the major fault (in map view for strike-slip faults, in cross-sectional view for normal faults); and (4) for strike-slip faults, have the same sense of displacement as the major fault with which they are associated, or for normal faults, dip in the same direction. The R set of Riedel shears and the P shears of Tchalenko and Ambraseys (1970) are synthetic faults (Figs. 1, 3).

Tear fault—A strike-slip or oblique-slip fault within or bounding an allochthon produced by either regional extension or regional shortening. Tear faults accommodate differential displacement within a given allochthon, or between the allochthon and adjacent structural units.

Tectonic depression—(1) Any structurally produced topographic low; (2) a topographic low produced by strike-slip deformation (Clayton, 1966).

Tectonic subsidence—That part of the subsidence at a given point in a sedimentary basin caused by a tectonic driving mechanism. Tectonic subsidence is calculated by removing the component of subsidence produced by non-tectonic processes such as sediment loading, sediment compaction, and water-depth changes (Watts and Ryan, 1976; Steckler and Watts, 1978; Keen, 1979; Bond and Kominz, 1984).

Tension—A system of stresses that tends to lengthen or increase the volume of a substance. Uniaxial tension involves one nonzero principal stress, which is tensile; in general tension, two principal stresses are tensile (Means, 1976, p. 79). It is possible for a tensile principal stress to occur with one or more compressive principal stresses.

Tension (T) fracture—A mode I crack that forms when lithostatic loads become negative (Lawn and Wilshaw, 1975, p. 52; J. T. Engelder, personal commun., 1985). See extension fracture. In strike-slip systems, extension fractures and tension fractures form in response to simple shear at about 45° to the master fault (Fig. 1; Tchalenko and Ambraseys, 1970).

Thermal subsidence—That part of the tectonic subsidence at a given point in a sedimentary basin caused by thermal contraction (Sleep, 1971; Parsons and Sclater, 1977). See tectonic subsidence.

Thrust fault—A map-scale contraction fault that shortens an arbitrary datum, commonly but not necessarily bedding (McClay, 1981). The term may be applied to faults of any dip, although thrust faults tend to dip less than 30° during active slip.

Trace slip—The component of slip measured parallel with the trace of a bed, vein, or other surface on the fault plane (Reid et al., 1913, p. 170; Beckwith, 1941, p. 2182).

Transcurrent fault—(1) A strike-slip fault, typically subvertical at depth and commonly involving igneous and metamorphic basement as well as supracrustal sediments and sedimentary rocks (see Moody and Hill, 1956; Freund, 1974; nearly synonymous with wrench fault); (2) a long, subvertical strike-slip fault that cuts strata approximately perpendicular to strike (original sense of Geikie, 1905, p. 169; modified from Dennis, 1967; p. 57).

Transform fault—A strike-slip fault that acts as a lithospheric plate boundary and terminates at both ends against major tectonic features (such as oceanic ridges, subduction zones, or rarely, other transform faults) that are also plate boundaries (Wilson, 1965; Freund, 1974).

Transform margin—A plate margin formed by a transform fault or system of transform faults and dominated by strike-slip deformation.

Transgression—A landward movement of a shoreline, generally expressed as a landward migration of shallow-marine facies (modified from Mitchum, 1977, p. 211).

Transtension—A system of stresses that operates in zones of oblique extension (modified from Harland, 1971). See divergent strike-slip or wrench fault, transpression.

Transpression—A system of stresses that operates in zones of oblique shortening (modified from Harland, 1971; Sylvester and Smith, 1976). See convergent strike-slip or wrench fault, transtension.

Trend—The azimuth of an inclined or horizontal line.

Unconformity—A buried surface of erosion or non-deposition (modified from J. C. Crowell, personal commun., 1975).

Underlapping faults—Approximately parallel faults that overstep without overlapping (applied to oceanic ridge segments by Pollard and Aydin, 1984).

Wedge graben—A basin formed by extension at a releasing junction between two predominantly strike-slip faults having the same sense of offset (Freund, 1982; synonymous with fault-wedge basin of Crowell, 1974a). See releasing fault junction.

Wrench fault—A strike-slip fault, typically sub-vertical at depth, involving igneous and metamorphic basement rocks as well as supracrustal sediments and sedimentary rocks (modified from Moody and Hill, 1956, p. 1208; Wilcox et al., 1973; nearly synonymous with transcurrent fault).

Y-shear—A fault that forms in response to simple shear, and as deformation continues gradually accommodates most of the movement along the principal displacement zone (Bartlett et al., 1981).

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