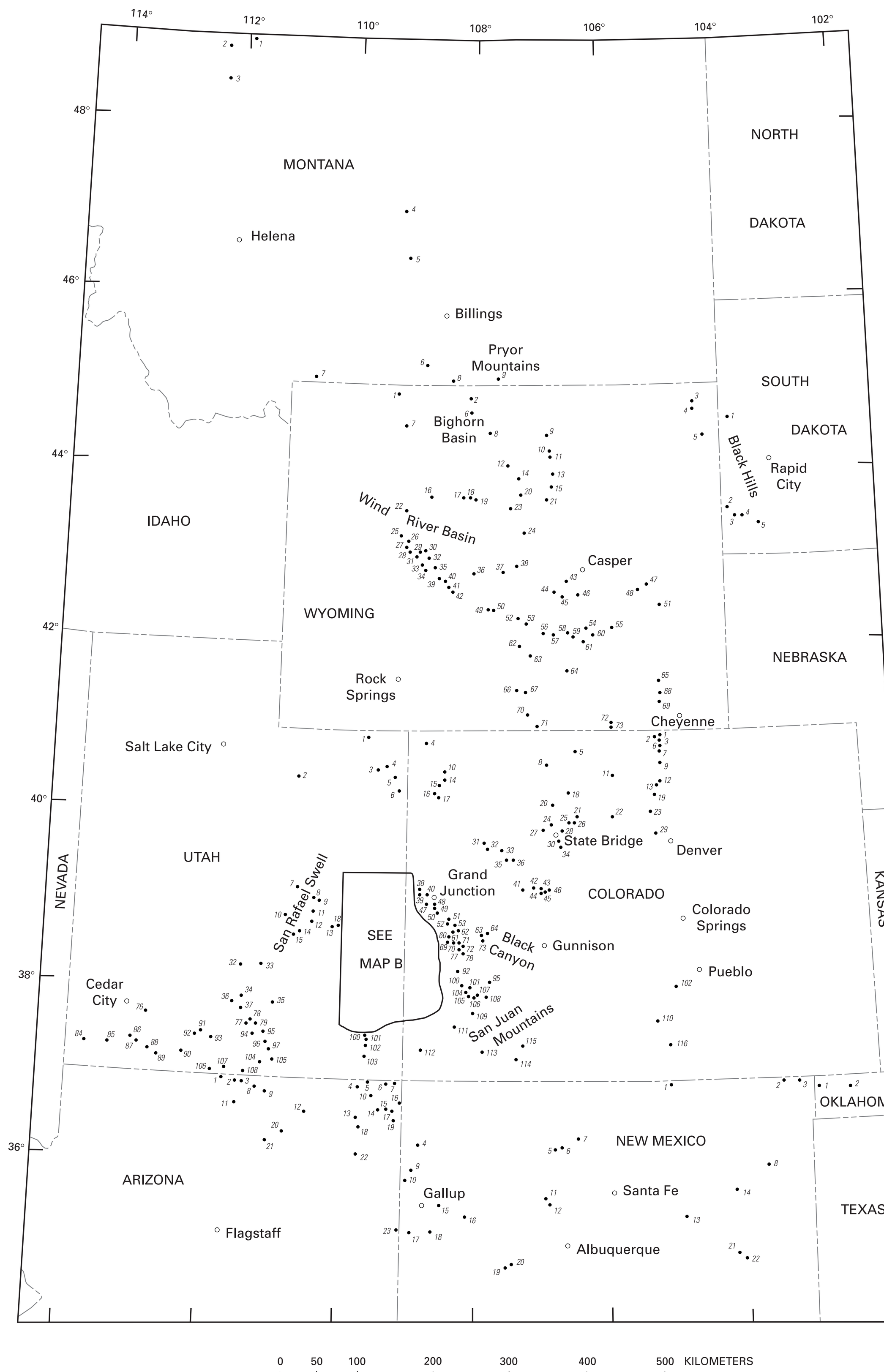
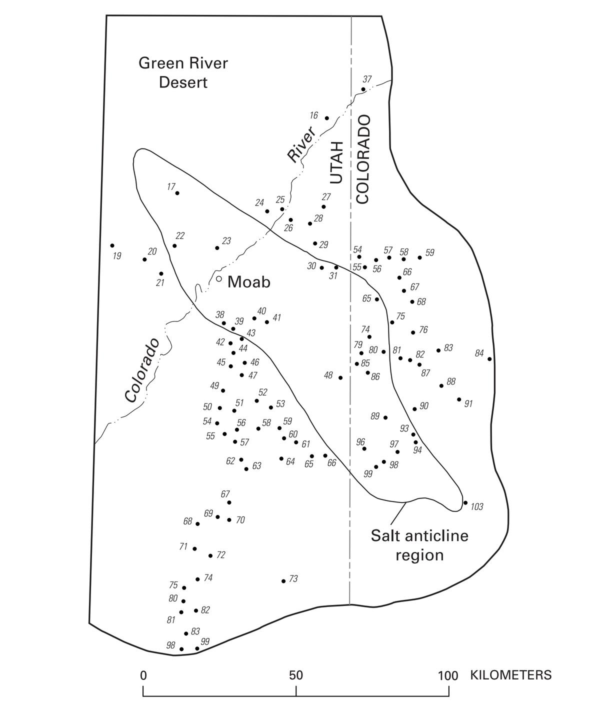


MAP A. CLAST LOCALITIES IN THE WESTERN INTERIOR OF THE UNITED STATES
[Letter prefixes denoting State name have been deleted from locality numbers for clarity]



MAP B. CLAST LOCALITIES IN THE SALT ANTICLINE REGION OF COLORADO AND UTAH
[Letter prefixes denoting State name have been deleted from locality numbers for clarity]

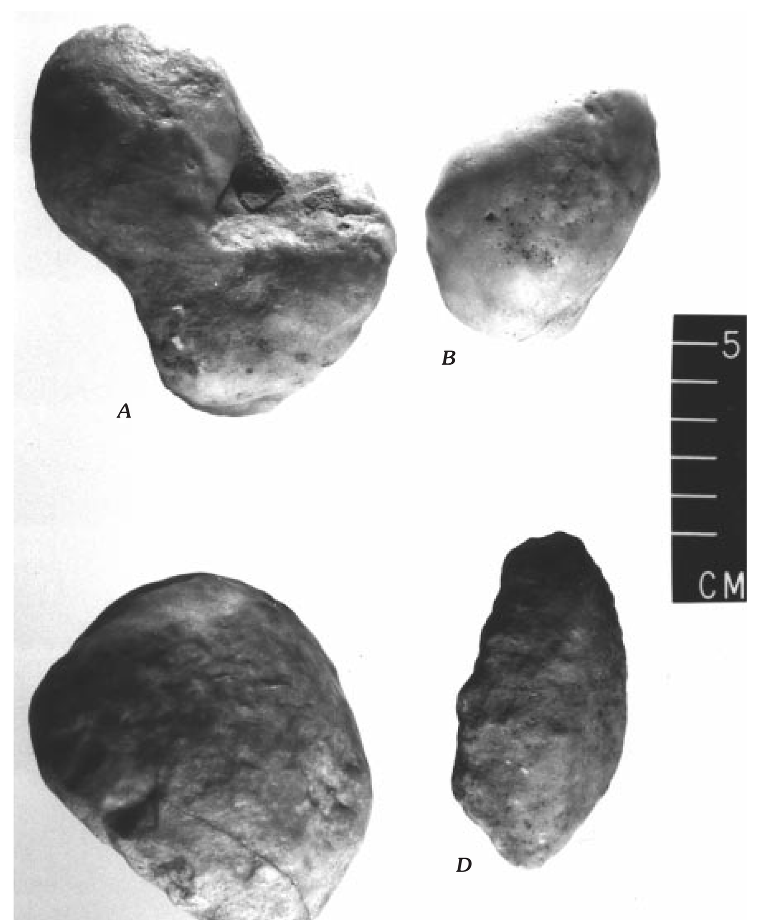


Figure 1. Clasts on J-2 unconformity derived from cherty limestone beds in Navajo Sandstone. Collection localities: *A*, Butler Wash, Utah [U99]; *B*, Spotted Wolf Canyon, Utah [U11]; *C*, Smith Cabin, Utah [U9]; *D*, Blue Creek, Colorado [C68].

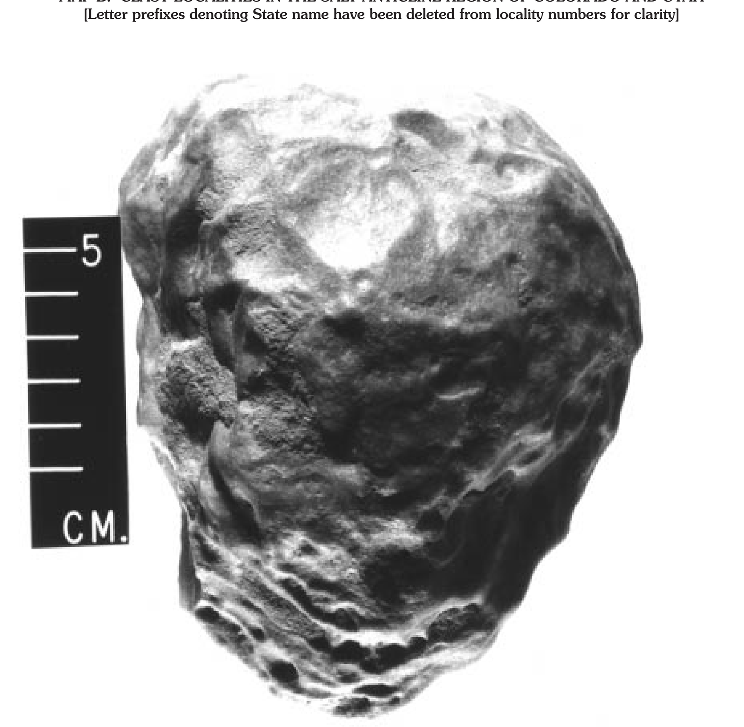


Figure 2. Large clast on J-2 unconformity, about natural size, derived from cherty limestone bed in Navajo Sandstone. Collected at Ruby Canyon, Colorado [C37].

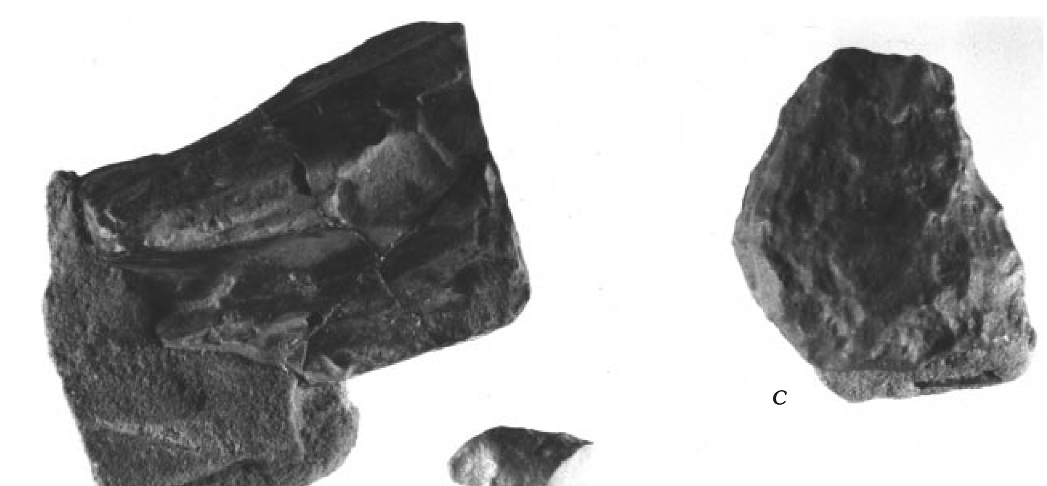


Figure 3. Unusual clasts on J-2 unconformity. *A*, chertified wood, probably derived from Triassic rocks; collected at Radium Trail [C81]; *B* and *C*, pink chert pebbles derived from Navajo Sandstone; collected at Brush Creek, Utah [U4]. *D* and *E*, pink chert pebbles derived from Nugget Sandstone; *D* is unweathered, *E* is weathered; collected at Ferris Mountain, west, Wyoming [W52].

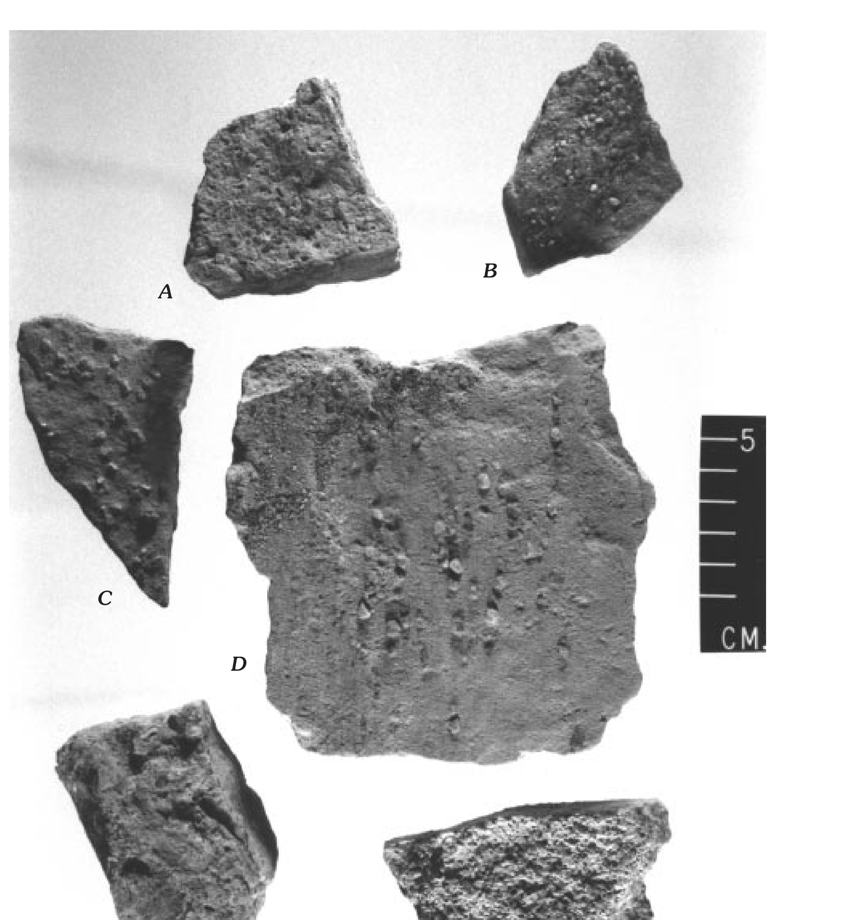


Figure 4. Grit and small pebbles associated with the J-2 unconformity. Collection localities: *A*, Four Mile Canyon, Colorado [C23]; *B*, Sage Creek Basin, Wyoming [W67]; *C*, Justensen Flats, Utah [U10]; *D*, Bell Springs, Wyoming [W62]; *E*, Redwater Creek, South Dakota [SD1]; *F*, State Bridge, Colorado [C28].

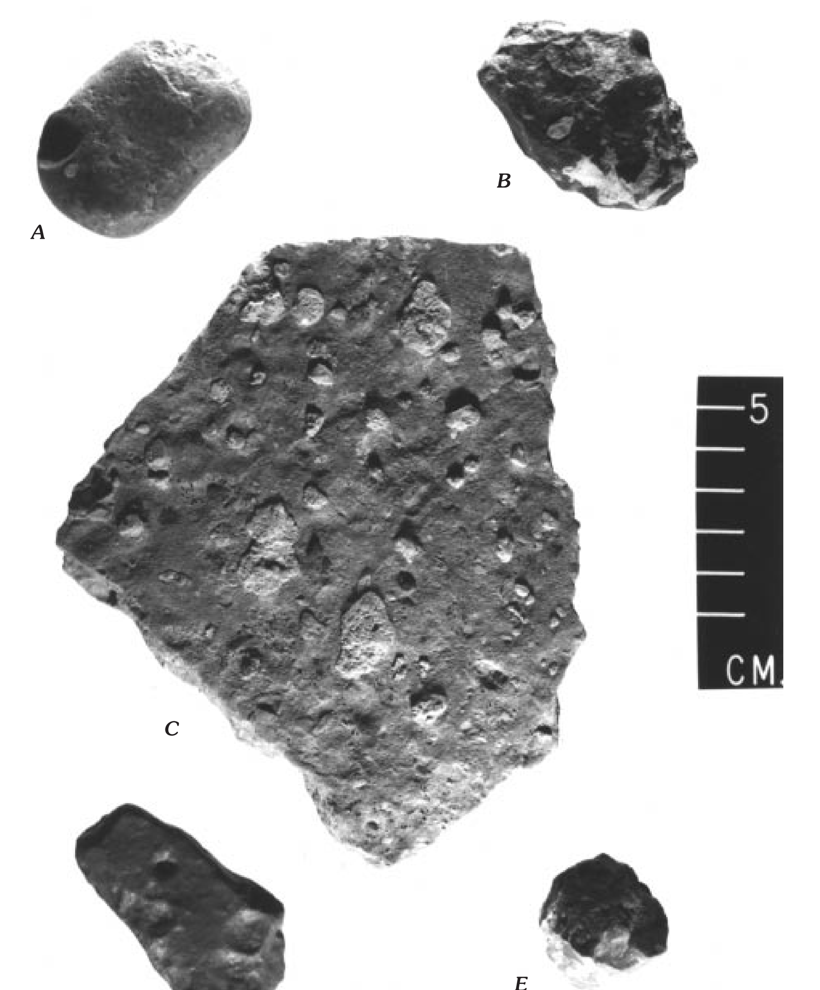


Figure 5. Clasts on J-2 unconformity derived from Gypsum Spring Formation. Collection localities: *A*, Douglas, Wyoming [W47]; *B* and *C*, Beaver Creek, Wyoming [W42]; *D*, Red Dome, Montana [M6]; *E*, Red Creek, Wyoming [W22].

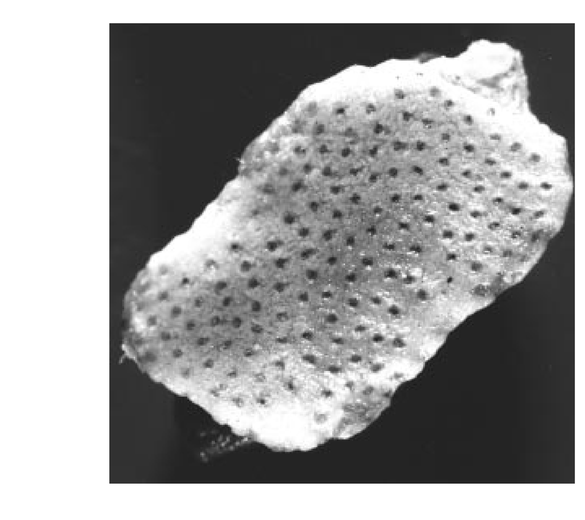


Figure 6. Small fossiliferous clast on J-2 unconformity, probably a piece of a bryozoan derived from Paleozoic rocks. Clast measures 6.8 mm in longest dimension; collected at Klondike basin, Colorado [C103].

NOTE

The J-2 unconformity of Middle Jurassic age is one of several found in Triassic and Jurassic rocks in the Western Interior of the United States. The J-2 unconformity differs from nearly all of these other unconformities in that it is associated with chert pebbles in most areas and is often termed the chert-pebble unconformity. Furthermore, the source of the chert and other associated pebbles can generally be identified. This report describes the lithology and distribution of pebbles on the J-2 surface. The sample localities are shown on maps A and B; the maximum clast size, lithologic type, and source rock of the pebbles are listed in table 1. Examples of some of the common and unusual clasts found on the J-2 unconformity are shown in figures 1–6. The relationship of the underlying beds, from which the clasts are derived, to the J-2 surface is shown on figure 7.

The data for each pebble locality in table 1 are not uniform. Pebble data were collected intermittently over a period of about 30 years. Initially, the significance of the pebbles was not understood. In 1960, G.N. Pipiringos first realized the importance of the pebbles as a stratigraphic marker during geologic investigations in central Wyoming. Table 1 reflects this change in emphasis. At some localities, for instance, the pebbles were only observed, but not necessarily measured or described. Later descriptions included more details on the size, lithologic type, and source of the pebbles.

The J-2 unconformity is described in several reports. The chert-pebble unconformity as well as other Jurassic and Triassic unconformities in the Western Interior of the United States is discussed in a report by Pipiringos and O'Sullivan (1978). The J-2 surface in the southwestern part of Utah is described by Peterson and Pipiringos (1979) and in east-central Utah by Pipiringos and O'Sullivan (1975). The unconformity in south-central Wyoming is discussed by Pipiringos (1968).

The chert pebbles or clasts on the J-2 surface are of four principal kinds: (1) pebbles banded in dark and light shades of gray, derived from the Middle Jurassic Gypsum Spring Formation (see Pipiringos, 1968, fig. 18); (2) pink and red clasts, most bleached by sunlight to shades of white, pale red, cream, and light gray, eroded from the Lower Jurassic Glen Canyon Group, mainly from the Navajo Sandstone (see Baker and others, 1936, pls. 13–14; and Pipiringos and O'Sullivan, 1975, fig. 6); (3) dark-red pebbles, some banded yellow, derived from the Triassic Chinle Formation and its equivalents; and (4) light- to dark-gray and black, a few dark-red, and locally some banded blue and tan chert pebbles derived from Paleozoic rocks.

Pebbles of other rock types are sometimes present on the J-2 unconformity. At places in western Colorado near Precambrian terranes, metamorphic rock fragments or pebbles of vein quartz are found in rocks directly on the J-2 unconformity. Such pebbles derived from Precambrian rocks are found in three different areas of Colorado: (1) near State Bridge in the northwestern part of the State [C20, C21, C24, C25, C27, C30, C42]; (2) in the Black Canyon of the Gunnison National Monument [C63, C64, C73]; and at Weminuche Creek [C115] in the San Juan Mountains. At some localities, such as Long Park A [C88] in western Colorado, chunks from underlying Jurassic sedimentary rocks constitute the largest clasts on the J-2 surface instead of the more durable chert pebbles. The presence of friable sedimentary rock clasts, which are easily destroyed by weathering, indicates a very local source, little transport, and rapid burial.

Chert pebbles in general are incorporated in rocks directly on the erosion surface, but in a few places they are found within a few centimeters to a meter or two above it. Locally, the pebbles are incorporated in dike-like injections into the underlying unit. Some of these injections are wedge shaped as at Horse Creek, Wyo. [W68], Four Mile Canyon, Colo. [C23], and Burns, Colo. [C27] and undoubtedly occupy widened joints. Others occupy irregularly shaped cavities in the underlying unit that were hollowed out by erosion as at Arches National Park, Utah [U23] (Pipiringos and O'Sullivan, 1975, fig. 4f).

An estimated 80 percent of the pebbles associated with the J-2 unconformity were eroded from the Gypsum Spring Formation and from the Glen Canyon Group. Of the remainder, about 10 percent came from Triassic rocks, 8 percent from Paleozoic rocks, and 2 percent from Precambrian rocks. The chert pebbles that were derived from the Gypsum Spring Formation came from bedded chert lenses and nodules in marine limestone beds occurring near the top of the formation. The chert pebbles derived from the Glen Canyon Group came principally from cherty limestone lenses that formed in ephemeral lakes among dunes prior to consolidation of the Navajo Sandstone. Similar limestone lenses are present, but scarce, in the Kayenta Formation and in the Wingate Sandstone. Pebbles from the Chinle Formation are from bedded chert that formed in lakes that existed during deposition of the Petrified Forest and Owl Rock Members and the informal ochre siltstone member of the Chinle Formation. All the cherts are composed almost entirely of fibrous chalcedony, but the different types can be distinguished both in thin section and in hand specimen.

The pebbles or clasts on the J-2 surface vary in size. The largest clast so far found on the J-2 unconformity is a limestone and chert cobble 45.6 cm across at Beaver Creek [W3] in the Black Hills of Wyoming (Mapel and Bergendahl, 1956, p. 88). The large clast has undoubtedly been eroded from the underlying Gypsum Spring Formation. The largest clast eroded from the Navajo Sandstone is a chert clast 20.3 cm across found at Allen Canyon [U75] in Utah. Pebbles and grit are absent at a few localities including Telluride [C108] in Colorado, Todilto Park [NM9] in New Mexico, and three places in Wyoming [W16, W55, W64]. The absence of pebbles or grit indicate either a lack of a nearby source rock or rapid burial of the J-2 surface before pebbles or grit could accumulate.

Chert pebbles derived from the Gypsum Spring Formation and the Glen Canyon Group are angular to subrounded and are commonly wind polished. In the San Rafael Swell and Green River Desert of Utah (Baker and others, 1936, p. 52–53, and pls. 13, 14) so-called "dreikanter" are supposedly derived from within the Navajo Sandstone and indicative of the environment of deposition. Instead they mark the J-2 unconformity of that area. Less common are wind-polished pebbles derived from the Gypsum Spring Formation and associated with the J-2 surface in the Wind River and Bighorn Basins of Wyoming and in the Pryor Mountains of Montana. Most of these pebbles are thinly banded and light to medium gray. Many pebbles are angular and are enclosed in a black rind less than 0.5 mm thick; they obviously were not transported far before the desert varnish was developed on their surface. In some places the chert pebbles in rocks directly above the J-2 surface and associated with it can be distinguished from angular fragments of chert beds directly underlying the J-2 surface only by their desert patina or by their high polish.

At Dry Muddy Creek [W11] and Douglas [W47] in Wyoming, and at many other places, the Gypsum Spring-derived pebbles are well rounded as though worked by wave action on a beach, or more probably by transportation in ancient stream channels; they were later fluted, etched, and polished by the wind. These rounded pebbles range from a few centimeters to as much as 13 cm in maximum diameter.

The size of pebbles derived from the Navajo Sandstone appears to vary across Utah. In southwestern Utah, the J-2 surface is mostly marked by grit and scarce pebbles. Above the Navajo Sandstone in eastern Utah, pebbles at a large number of localities range from 5 cm to the maximum found to date of 20.3 cm at Allen Canyon [U75]. The Navajo Sandstone is as much as 677 m thick in southwest Utah (Wilson, 1965, p. 42). It thins eastward beneath the J-2 unconformity and is truncated roughly at a line that trends along and near the Utah-Colorado State line. Much of the eastward thinning is due to erosion associated with the development of the J-2 unconformity. In southwest Utah, probably little of the Navajo Sandstone was eroded. Eastward across Utah, erosion during the Middle Jurassic removed large volumes of sandstone, and exposed the cherty limestone beds which are the source for the chert clasts that now mark the J-2 surface.

The Navajo Sandstone probably extended eastward beyond its present-day limits. At Ruby Canyon [C37] about 10 km east of the pinchout of the Navajo Sandstone, pebbles on the J-2 surface derived from the Navajo are as much as 15.6 cm across. Near Grand Junction, at Rough Canyon [C48], about 50 km east of the limits of the Navajo Sandstone, chert pebbles on the J-2 unconformity derived from the Navajo are as much as 70 mm across. The clasts may have been transported into the area from the west, but more likely they are a selective lag accumulation of pebbles that were concentrated by erosion as the Navajo Sandstone was removed in the Ruby Canyon–Grand Junction area during Middle Jurassic time.

Pebbles on the J-2 surface that were derived from Paleozoic and Precambrian rocks are, for the most part, difficult to characterize. However, there are some exceptions. On the east side of the Bighorn Basin, unique chert pebbles are found on the J-2 unconformity. These pebbles, probably eroded from Paleozoic rocks, are composed of alternating bands of tan and milk-blue chert. Parallel contacts between the thin bands are interrupted where digitations of blue chert fill what seems to be minute shrinkage cracks developed in the tan bands. Frederickson and others (1956, p. 2132–35, 2141–44) also identified several chert varieties derived locally from Paleozoic rocks that are associated with the J-2 surface in the Canon City area, Colorado.

Paleozoic rocks also contributed unusual pebbles to the J-2 surface in the Salt anticline region of east-central Utah and adjacent parts of Colorado (see map B). The Salt anticline region is characterized by a number of long northwest-trending anticlines cored by salt of Paleozoic age (Cater, 1970). During the late Paleozoic and the early part of the Mesozoic, salt flowed intermittently from surrounding areas into the linear anticlines. The movement of salt bowed up rocks on the flanks of the anticlines and at least locally exposed rocks of Paleozoic age during the formation of the J-2 unconformity in the area. Chert pebbles found on the J-2 surface at Salt Valley [U17] and Uravan [C83] contain fusulinids and bryozoans that were derived from Paleozoic rocks. A chertified fragment of bryozoa, measuring 6.4 mm across, that must have been weathered out of a nearby outcrop of Paleozoic rocks during the Middle Jurassic time is on the J-2 surface at Klondike Basin [C103]. At Radium Trail [C81], the largest clast found (about 65 mm long) is a piece of black petrified wood that most likely is from Triassic rocks.

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Table 1. *Clast data*

[Symbols used: Location: un, unsurveyed. Maximum size of clast found: LFNF, pebbles or granules were looked for but not found; ONM, pebble was observed but not measured. Lithologic type: C, chert; Cl, clay; Ge, gneiss; Ls, limestone; ND, not described; S, sandstone or siltstone; Sc, schist; Q, quartz; Q_3, quartzite. Source rock: G, Gypsum Spring Formation; K, Kayenta Formation; N, Navajo or Nugget Sandstone; Pz, Paleozoic rocks; p€, Precambrian; SU, source uncertain; TR, Triassic rocks. Remarks: B-, pebbles or granules were noted, measured, or collected by person cited]

Locality	Locality name	Location (Sec., T., R., or long W., lat N.)	Maximum size of clast found	Lithologic type	Source rock	Remarks
		ARIZONA				
A1	Cedar Mountain	NE 1/4 SW 1/4 4, 41 N., 6 E. (un)	6 mm	C	N	B-Fred Peterson.
A2	Ferry Swale	NE 1/4 SW 1/4 21, 41 N., 8 E.	8 mm	C	N	Do.
A3	Page	SW 1/4 NW 1/4 19, 41 N., 9 E. (un)	5 mm	C	N	Do.
A4	Garnet Ridge	109°45'13", 36°55'41"	16X10X9 mm	C	N	
A5	Mexican Water	109°35'58", 36°59'20"	33X22X17 mm	C	N	
A6	West Red Mesa	NW 1/4 NE 1/4 SE 1/4 4, 41 N., 28 E. (un)	64X37X29 mm	C	N	
A7	East Red Mesa	NW 1/4 SE 1/4 NE 1/4 6, 41 N., 29 E. (un)	22X14X11 mm	C	N	
A8	Leche-e Rock	111°16'37", 36°52'17"	4 mm	C	N	
A9	Tsai Skizzi Rock	111°06'43", 36°49'20"	3 mm	C	N	B-Fred Peterson.
A10	West Toh Acon Mesa	109°31'50", 36°47'38"	67X47X28 mm	C	N	
A11	Antelope Pass	111°33'57", 36°40'16"	6 mm	C	N	B-Fred Peterson.
A12	Klethla Valley	110°29'10", 36°34'02"	8 mm	C	N	Do.
A13	Carson Mesa	109°45'36", 36°31'21"	39X15X5 mm	C	N	
A14	East Toh Acon Mesa	109°22'30", 36°39'12"	50X28X15 mm	C	N	
A15	Cove Mesa	109°17'15", 36°38'40"	22X18X10 mm	C	N	
A16	Horse Mesa	109°03'07", 36°41'45"	Grit to 2.2 mm	Q, C	SU	
A17	Cove School	109°14'18", 36°32'22"	13X10X6.3 mm	C	N	
A18	Many Farms	109°44'10", 36°23'40"	21X13X11 mm	C	N	
A19	Lukachukai	109°10'27", 36°27'	Grit	Q, C	SU	
A20	Cow Springs	110°48'09", 36°24'49"	17X13X10 mm	C	N	
A21	Middle Mesa	111°01'03", 36°14'13"	Grit to 3 mm	Q, C	SU	B-Fred Peterson.
A22	Lohali Point	109°44'48", 36°06'12"	Grit	Q, C	SU	
A23	Lupton, south	NW 1/4 NE 1/4 9, 22 N., 31 E.	Grit	Q, C	SU	
		COLORADO				
C1	Sand Creek	SW 1/4 NW 1/4 8, 11 N., 69 W.	Grit	Q, C	SU	
C2	Table Mountain	NE 1/4 NE 1/4 13, 11 N., 70 W.	Grit	Q, C	SU	
C3	Boxelder, north	C E 1/2 E 1/2 30, 11 N., 69 W.	Grit	Q, C	SU	
C4	Irish Lake	SW 1/4 SW 1/4 SW 1/4 34, 11 N., 101 W.	18X17X12 mm	C	Pz	Other pebbles are a mixture derived from G and Pz.
C5	Sheep Mountain	SE 1/4 SE 1/4 NE 1/4 4, 9 N., 81 W.	6 mm	C	Pz	
C6	Boxelder, south	SE 1/4 SW 1/4 NW 1/4 8, 10 N., 69 W.	45 mm	S	TR	
C7	Owl Canyon	SW 1/4 NE 1/4 NW 1/4 5, 9 N., 69 W.	15 mm	C	Pz	
C8	Ditch Creek	SW 1/4 NW 1/4 NE 1/4 25, 8 N., 85 W.	6.6 mm	C	Pz	
C9	Bellvue	SE 1/4 NW 1/4 NE 1/4 31, 8 N., 69 W.	Grit	Q, C	SU	
C10	Little Snake River	S 1/2 SW 1/4 29, 7 N., 98 W.	Grit	Q, C	SU	
C11	Cameron Pass	C E 1/2 W 1/2 NE 1/4 11, 6 N., 76 W. (un)	Grit	Q, C	SU	
C12	Loveland	SE 1/4 SW 1/4 SW 1/4 8, 5 N., 69 W.	Grit to 2 mm	Q, C	SU	
C13	Dry Creek	C W 1/2 NE 1/4 NW 1/4 24, 5 N., 70 W.	68X35X20 mm	C	Pz	
C14	Deerlodge Park	NE 1/4 NE 1/4 NW 1/4 28, 6 N., 99 W.	17X9X6 mm	C	Pz	
C15	Calico Draw	SE 1/4 SE 1/4 SW 1/4 4, 5 N., 99 W.	18X13X13 mm	C	G	
C16	Miller Creek	SE 1/4 SW 1/4 27, 4 N., 101 W.	17X14X12mm	C	Pz	
C17	Skull Creek	SE 1/4 NE 1/4 36, 4 N., 101 W.	18 mm	C	N	
C18	Frantz Creek	SE 1/4 NW 1/4 SE 1/4 32, 4 N., 82 W.	Grit	Q, C	SU	
C19	Little Thompson	C NE 1/4 NE 1/4 4, 3 N., 70 W.	Grit	Q, C	SU	
C20	Muddy Slide	NE 1/4 14, 2 N., 84 W.	5 mm	Q_3	TR or p€	
C21	Kremmling	NE 1/4 NE 1/4 NW 1/4 21, 1 N., 81 W.	18 mm	Sc, Q_3	p€	
C22	Tabernash	SW 1/4 SE 1/4 NE 1/4 32, 1 N., 76 W.	Grit	ND	SU	
C23	Four Mile Canyon	NW 1/4 NW 1/4 SW 1/4 12, 1 N., 71 W.	Grit	ND	SU	
C24	Elk Creek	NE 1/4 NE 1/4 SW 1/4 33, 1 S., 84 W.	88X77X37 mm	Sc	p€	
C25	Radium, southwest	SW 1/4 NW 1/4 27, 1 S., 82 W.	24 mm	Sc	p€	
C26	Radium, southeast	SW 1/4 NE 1/4 26, 1 S., 82 W.	12 mm	ND	TR	
C27	Burns	NW 1/4 NW 1/4 NW 1/4 28, 2 S., 85 W.	32.2X25.4X15.3 mm	Sc	p€	
C28	State Bridge	SW 1/4 24, 2 S., 83 W.	26X20X16 mm	C	Pz	
C29	Ralston Reservoir	NE 1/4 NW 1/4 SW 1/4 5, 3 S., 70 W.	Grit	ND	SU	
C30	Wolcott	NE 1/4 SW 1/4 SE 1/4 8, 4 S., 83 W.	10X8.3X4.6 mm	Sc	p€	
C31	Harris Reservoir	SW 1/4 NE 1/4 NE 1/4 18, 4 S., 93 W.	6.1X4.6X3.2 mm	C	Pz	
C32	Middle Rifle Creek	SW 1/4 SW 1/4 NE 1/4 36, 4 S., 93 W.	14.2X8.6X6.4 mm	C	Pz	
C33	Main Elk Creek	NE 1/4 NE 1/4 NE 1/4 22, 5 S., 91 W.	Grit to 1 mm	Q, C	SU	
C34	Edwards	NW 1/4 NW 1/4 SW 1/4 25, 4 S., 83 W.	Grit to 3.4 mm	Q, C	TR, Pz	
C35	Chacra	SE 1/4 NE 1/4 SE 1/4 35, 5 S., 90 W.	9.2X6.4X6.3 mm	C	Pz	
C36	South Canyon Creek	C W 1/2 SE 1/4 2, 6 S., 90 W.	6 mm	C	SU	
C37	Ruby Canyon	SE 1/4 lot 2, 5, 11 S., 104 W.	15.6X11.8X7.1 cm	C	N	
C38	Loma	NE 1/4 NE 1/4 SW 1/4 8, 1 N., 3 W.	45.3X29.9X20 mm	Q_3	Pz	
C39	Black Ridge	SE 1/4 SE 1/4 NW 1/4 20, 1 N., 3 W.	11.6X10X4.9 cm	C	N	
C40	Fruita Reservoir	NW 1/4 NW 1/4 NW 1/4 32, 1 N., 2 W.	73X62X44 mm	C	Pz	
C41	Redstone	NE 1/4 SW 1/4 NW 1/4 20, 10 S., 88 W.	9.2X5.2X5.4 mm	Q	Pz	
C42	Capital Creek	107°04'37", 39°12'3"	Grit to 3.2 mm	Q.	p€	B-B.H. Bryant.
C43	East Snowmass Creek	SW 1/4, SE 1/4 SW 1/4 10, 10 S., 86 W.	Grit to 1.8 mm	Q, C	TR	
C44	Aspen	106°58'11", 39°09'23"	Grit to 2 mm	Q, C	SU	B-B.H. Bryant.
C45	Aspen, south	N 1/2 S 1/2 NE 1/4 24, 10 S., 86 W. (un)	Grit to 1.4 mm	Q, C	SU	B-B.H. Bryant.
C46	Willow Creek	106°54'05", 39°10'18"	Grit	Q, C	TR, Pz, p€	Do.
C47	Coke Ovens Trail	NE 1/4 NW 1/4 NW 1/4 30, 11 S., 101 W. (un)	15X8X6 mm	C	N	Pebbles from Pz also present.
C48	Rough Canyon	NW 1/4 SW 1/4 30, 12 S., 100 W. (un)	69.3X40.7X38.2 mm	C	N	
C49	Little Park Road	NW 1/4 NW 1/4 NW 1/4 30, 12 S., 100 W. (un)	27.6X21.9X21.7 mm	C	N	
C50	Cactus Park	NE 1/4 SE 1/4 SE 1/4 36, 13 S., 100 W.	4.8X4.2X2.3mm	C	Pz	
C51	Bridgeport	NW 1/4 NE 1/4 NE 1/4 18, 14 S., 98 W.	Grit to 2 mm	Q, C	SU	
C52	Little Dominguez	SW 1/4 SW 1/4 NW 1/4 29, 14 S., 98 W.	Grit to 1.6 mm	Q, C	SU	
C53	Dominguez	N 1/2 Lot 8, 30, 4 S., 3 E.	Grit to 1.8 mm	Q, C	SU	
C54	Lumsden Canyon	NW 1/4 SE 1/4 25, 51 N., 20 W. (un)	13.7X11.3X8.5 mm	C	N	
C55	John Brown Canyon	SW 1/4 SW 1/4 32, 51 N., 19 W. (un)	28X16.7X15.3 mm	C	N	
C56	Cave Canyon	NW 1/4 SE 1/4 34, 51 N., 19 W. (un)	77.3X64X41 mm	C	N	
C57	Tenderfoot Mesa B	SE 1/4 NW 1/4 NE 1/4 36, 51 N., 19 W.	11.4X9.6X8.5 mm	C	N	
C58	Tenderfoot Mesa A	NE 1/4 SW 1/4 SE 1/4 31, 51 N., 18 W.	28.2X21.6X14.7 mm	C	N	Small quartzite pebble from Pz also present.
C59	Maverick Canyon B	NE 1/4 SE 1/4 NE 1/4 32, 51 N., 18 W.	16X9X2 mm	S	K	
C60	Escalante Forks	SW 1/4 NE 1/4 NW 1/4 36, 51 N., 14 W.	3.6X3X1.4 mm	C	SU	
C61	Escalante Creek #3	SE 1/4 SW 1/4 NW 1/4 21, 51 N., 13 W.	Grit to 2.8 mm	Q, C	SU	
C62	Escalante Creek #2	SE 1/4 SE 1/4 SW 1/4 36, 15 S., 98 W.	Grit to 2 mm	Q, C	SU	
C63	Duncan Trail	107°51'47" 38°39'40"	39.9X37.8X24.8 mm	Q	p€	
C64	Red Canyon	107°48'29", 38°40'08"	24.6X19.4X11.7 mm	Q	p€	
C65	Sinbad Valley	NW 1/4 NW 1/4 31, 50 N., 19 W.	25.4 mm	C	N	Cater (1970, p. 29).
C66	Flat Top Mesa	SW 1/4 SW 1/4 17, 50 N., 18 W.	25.4X15.2X7.6 cm	Ls	N	
C67	Calamity Mesa, southwest	NW 1/4 SE 1/4 SE 1/4 32, 50 N., 18 W.	6.4X3.2X1.6 mm	C	N	
C68	Blue Creek	NW 1/4 SE 1/4 SE 1/4 3, 49 N., 18 W.	86.5X45.4X35.5 mm	C	N	
C69	Escalante Forks A	NE 1/4 SW 1/4 NE 1/4 14, 50 N., 14 W.	Grit to 1 mm	Q, C	SU	
C70	Dry Fork	NW 1/4 SE 1/4 NE 1/4 20, 50 N., 13 W.	Grit to 1.2 mm	Q, C	SU	
C71	Monitor Creek 1	SW 1/4 NW 1/4 NW 1/4 30, 50 N., 12 W.	Grit	Q, C	SU	
C72	Roubideau Creek A	SW 1/4 NE 1/4 SW 1/4 26, 50 N., 12 W.	Grit, sparse	Q, C	SU	
C73	Chukar Trail	107°50'32", 38°36'40"	42.1X15.5X5.3 mm	Ge	p€	
C74	Carpenter Ridge Truck Road.	NW 1/4 SW1/4 NE 1/4 16, 48 N., 19 W.	11.9X10X6.8 mm	C	Pz	
C75	Beehive Canyon	SE 1/4 NW 1/4 SW 1/4 11, 48 N., 18 W.	31X21.5X10 mm	C	N	
C76	Atkinson Mesa	SW 1/4 NE 1/4 NE 1/4 23, 48 N., 18 W.	Grit to 4 mm	Q, C	SU	
C77	Roubideau B	NW 1/4 NW 1/4 NE 1/4 21, 49 N., 12 W.	Grit to 1 mm	Q, C	SU	
C78	Roubideau C	SE 1/4 SE 1/4 SW 1/4 27, 49 N., 12 W.	Grit	Q, C	SU	
C79	West Paradox Creek	SE 1/4 SW 1/4 NE 1/4 30, 48 N., 19 W.	20.3X12.7X10.2 cm	Q_3	Pz	
C80	Sunrise Canyon	NW 1/4 SE 1/4 NW 1/4 24, 48 N., 19 W.	6.4 mm	C	SU	
C81	Radium Trail	SW 1/4 SE 1/4 NE 1/4 29, 48 N., 18 W.	64.6X41X24 mm	C	Pz	Pebble is chertified wood; also pebbles as much as 20 mm across of silicified limestone derived from TR.
C82	Martin Mesa	SE 1/4 SE 1/4 NE 1/4 27, 48 N., 18 W.	9.1X8X7.7 mm	C	N	
C83	Uravan	Near C SE 1/4 SE 1/4 34, 48 N., 17 W.	31X22X20.7 mm	Q_3	Pz	Also includes pebbles as wide as 21 mm derived from N. There is a piece of bryozoan in one pebble and a fusulinid in another (D.A. Myers, oral commun., 1987); both pebbles are from Pz.
C84	Tabeguache Creek	108°33'52", 38°21'39"	Grit	Q, C	Pz	
C85	Lion Creek	SE 1/4 SW 1/4 SW 1/4 12, 47 N., 20 W.	13 mm	Q_3	Pz	Also abundant chert pebbles as wide as 6 mm from N.
C86	La Sal Creek	SE 1/4 SW 1/4 NW 1/4 17, 47 N., 19 W.	15 mm	C	N	B-Fred Peterson.
C87	Saucer Basin	SW 1/4 SE 1/4 NE 1/4 1, 47 N., 18 W.	9.5X3.2X3.2 mm	S	K	
C88	Long Park A	NW 1/4 SW 1/4 NW 1/4 2, 46 N., 17 W.	20.3X10.2X3.8 cm	S	K	Also milky quartz pebbles as wide as 12.5 mm from Pz.
C89	Leach Creek	SW 1/4 SW 1/4 SW 1/4 29, 46 N., 18 W.	44.5X43.4X20.7 mm	C	N	
C90	Indian Henrys Cabin	SW 1/4 NE 1/4 NW 1/4 2, 45 N., 18 W. (un)	54.7X40.9X24.7 mm	C	Pz	
C91	Sawtooth Ridge	SE 1/4 SE 1/4 NW 1/4 18, 46 N., 16 W.	Grit to 1 mm	Q, C	SU	
C92	Horsefly Creek	SE 1/4 SW 1/4 SW 1/4 13, 46 N., 13 W.	Grit	Q, C	SU	
C93	Peters Knob	108°51'38", 38°10'13"	9.5X6.4X4.8 mm	C	N	
C94	Hamm Canyon	NE 1/4 NW 1/4 NW 1/4 35, 45 N., 18 W.	11.5X10.6X9.3 mm	C	N	
C95	Ouray	SW 1/4 NE 1/4 NW 1/4 35, 45 N., 8 W.	Grit to 4.4 mm	Q	Pz, TR	
C96	McIntyre Canyon	SW 1/4 NE 1/4 NW 1/4 17, 44 N., 19 W.	24X15.6X12.8 mm	C	N	
C97	Cape Horn	SE 1/4 NW 1/4 NW 1/4 8, 44 N., 18 W.	62.3X49.6X43.8 mm	C	N	
C98	Poverty Flat	SW 1/4 SE 1/4 NW 1/4 25, 44 N., 19 W.	46X41X30 mm	C	N	
C99	Slick Rock	NW 1/4 NW 1/4 NE 1/4 36, 44 N., 19 W.	75.8X61X51.2 mm	C	N	
C100	San Miguel Canyon	108°10'41", 38°05'06"	Grit to 0.6 mm	Q	SU	
C101	Leopard Creek	SW 1/4 NW 1/4 NW 1/4 24, 44 N., 11 W.	Grit	C, Q	SU	
C102	Beulah	NW 1/4 SE 1/4 SE 1/4 2, 23 S., 68 W.	35X25X22 mm	C	Pz	
C103	Klondike Basin	SE 1/4 SW 1/4 SE 1/4 9, 43 N., 16 W.	23X19.2X13.5 mm	C	Pz	Also includes chert pebbles from TR and a piece of a bryozoan from Pz.
C104	Specie Creek	108°07'08", 38°00'47"	Grit to 1 mm	Q	SU	
C105	Fall Creek	NW 1/4 SW 1/4 NW 1/4 25, 43 N., 11 W.	Grit to 1.4 mm	Q, C	SU	
C106	Big Bear Creek	NW 1/4 SW 1/4 SE 1/4 33, 43 N., 10 W.	Grit to 1 mm	Q, C	SU	
C107	Bilk Creek	SE 1/4 NE 1/4 SE 1/4 26, 43 N., 10 W.	Grit	Q, C	SU	
C108	Telluride	107°48'03", 37°56'22"	LFNF			
C109	Barlow Creek south	107°59'37", 37°45'56"	Grit to 1 mm	Q, C	SU	
C110	Pass Creek	SW 1/4 NE 1/4 NE 1/4 18, 27 S., 70 W.	Grit	Q, C	SU	
C111	Stoner	NE 1/4 SW 1/4 SE 1/4 36, 39 N., 14 W.	Grit to 1 mm	Q, C	SU	
C112	McElmo Dome	SE 1/4 31, 36 N., 17 W.	4.4X13.2X1 mm	C	N	
C113	Durango	NW 1/4 NW 1/4 NW 1/4 4, 35 N., 9 W.	Grit	Q, C	SU	
C114	Piedra River	SE 1/4 SW 1/4 NW 1/4 5, 34 N., 4 W.	Grit	Q, C	SU	
C115	Weminuche	107°14'04", 37°23'49"	20.3 cm	Q_3	p€	B-K.J. Franczyk.
C116	La Veta	SW 1/4 SE 1/4 SW 1/4 26, 30 S., 69 W.	Grit	Q, C	SU	
		MONTANA				
M1	R. G. Parrent 1 McAlpine	NW 1/4 SE 1/4 25, 37, N., 3 W.	ONM	C	SU	Described by Cobban (1945, p. 1302, 1303).
M2	Carter Oil Co. 25 Tribal	SE 1/4 NW 1/4 27, 36 N., 6 W.	ONM	C	SU	Cobban (1945, p. 1301).
M3	Hannah-Porter Co. 1 Marceau	SE 1/4 NW 1/4 3, 31 N., 6 W.	ONM	C	SU	Cobban (1945, p. 1300).
M4	Heath	SW 1/4 SW 1/4 SW 1/4 1, 14 N., 19 E.	59X36X21 mm	C	Pz	
M5	Suction Creek Dome	SW 1/4 SW 1/4 SW 1/4 12, 8 N., 20 E.	42X35X32 mm	C	Pz	
M6	Red Dome	NE 1/4 NE 1/4 19, 7 S., 24 E.	60X32X12 mm	C	G	
M7	Gardiner	SW 1/4 19, 9 S., 9 E.	ONM	C	SU	Fraser and others (1969, p. 21).
M8	Gypsum Creek	SE 1/4 33, 9 S., 27 E.	58X28X29 mm	C	G, Pz	
M9	Lodge Grass Creek	NW 1/4 SW 1/4 SW 1/4 8, 9 S., 33 E.	85X47X30 mm	C	G	
		NEW MEXICO				
NM1	Ricardo Creek	105°09'30", 36°59'09"	Grit	Q, C	SU	B-C.L. Pillmore.
NM2	Valley	SW 1/4 NE 1/4 SE 1/4 32 32 N., 33 E.	5 mm	Ls	TR	B-W.I. Finch.
NM3	Battleship Mountain	SE 1/4 NW 1/4 SE 1/4 28, 32 N., 35 E.	8 mm	C	Pz	Do.
NM4	Toadlena	108°53'34", 36°14'48"	Grit	Q, C	SU	
NM5	Mesa Alta	NE 1/4 NW 1/4 NW 1/4 23, 23 N., 1 E.	Grit to 4 mm	Q, C	SU	B-W.W. Green.
NM6	Gallina	SW 1/4 SW 1/4 NW 1/4 18, 23 N., 2 E.	Grit to 0.6 mm	Q, C	SU	B-J.L. Ridgley.
NM7	Ghost Ranch	NW 1/4 NW 1/4 4, 24 N., 4 E.	Grit	Q, C	SU	
NM8	Gonzales Hill	NE 1/4 2, 20 N., 30 E.	Grit	Q, C	SU	B-W.I. Finch.
NM9	Todilto Park	108°58'15", 35°57'15"	LFNF			
NM10	Navajo	109°01'45", 35°49'50"	Grit	Q, C	SU	
NM11	Cachana Spring	NW 1/4 SW 1/4 SE 1/4 36, 17 N., 1 W. (un)	7 mm	C	TR	B-M.W. Green.
NM12	San Ysidro	NE 1/4 SW 1/4 NE 1/4 25, 16 N., 1 W. (un)	Grit to 3 mm	Q, C	SU	Do.
NM13	Mesa del Carro	105°02'27", 35°22'30"	Grit to 2 mm	Q, C	SU	Do.
NM14	Montoya	SE 1/4 SE 1/4 NE 1/4 10, 17 N., 26 E. (un)	10 mm	Cl	TR	B-W.I. Finch.
NM15	Wingate	NE 1/4 NE 1/4 17, 15 N., 16 W.	5 mm	Q, C	SU	
NM16	Thoreau	NE 1/4 NE 1/4 19, 14 N., 12 W.	31X23X15 mm	C	TR	
NM17	Cheechilgeetho	SW 1/4 NE 1/4 SE 1/4 13, 12 N., 20 W.	Grit	Q, C	SU	
NM18	Nutria	SW 1/4 NE 1/4 7, 12 N., 16 W.	Grit	Q, C	SU	
NM19	Acoma	SW 1/4 NE 1/4 NW 1/4 2, 7 N., 7 W.	10.2 cm	Q	TR	B-M.W. Green.
NM20	Petoch Butte	NE 1/4 NW 1/4 32, 8 N., 6 W.	83 mm	Q	TR	Stewart and others (1972, p. 213), and Moench and Schlee (1967, p. 7).
NM21	Lasatar Ranch	SW 1/4 SE 1/4 SW 1/4 32, 9 N., 26 E.	8.7X5.6X3.8 mm	C	TR	B-J.L. Ridgley.
NM22	Luciano Mesa	NE 1/4 NE 1/4 SW 1/4 8, 8N., 27 E.	5 mm	Q, C	TR	B-M.W. Green.
		OKLAHOMA				
OK1	Carrizozo Creek	NE 1/4 NW 1/4 SW 1/4 18, 5 N., 1 E.	Grit to 3 mm	C, Q	SU	B-W.I. Finch.
OK2	Picket House Draw	SW 1/4 NE 1/4 NW 1/4 36, 5 N., 5 E.	Grit to 3 mm	C, Q	SU	Do.
		SOUTH DAKOTA				
SD1	Redwater Creek	NW 1/4 SW 1/4 NE 1/4 11, 7 N., 1 E.	5.6 mm	C	G	
SD2	Dewey	SE 1/4 NW 1/4 NE 1/4 10, 6 S., 1 E.	50 mm	C	G	
SD3	Edgemont	SE 1/4 NE 1/4 NE 1/4 7, 7 S., 3 E.	74X58X34 mm	C	G	Pebbles derived from metamorphic rocks also present.
SD4	Minnekahta	Near C SE 1/4 NE 1/4 10, 7 S., 3 E.	25X16X9 mm	C	G	
SD5	Sheps Canyon	NW 1/4 NE 1/4 15, 8 S., 5 E.	25 mm	C	G	
		UTAH				
U1	Sheep Creek Gap	NW 1/4 NW 1/4 NW 1/4 7, 2 N., 20 E.	53X20X19 mm	C	G	
U2	Hanna	NE 1/4 SE 1/4 SE 1/4 4, 1 S., 8 W.	ONM	ND	SU	
U3	Steinaker Draw	NW 1/4 NW 1/4 26, 3 S., 21 E.	33X33X13 mm	C	N	
U4	Brush Creek	SE 1/4 NE 1/4 NW 1/4 2, 3 S., 22 E.	55X42X26 mm	C	N	
U5	Red Wash	SE 1/4 NE 1/4 SW 1/4 25, 4 S., 23 E.	6 mm	ND	SU	
U6	Cliff Ridge	SW 1/4 NW 1/4 SW 1/4 3, 6 S., 24 E.	6 mm	ND	SU	
U7	Buckhorn Wash	NW 1/4 SE 1/4 SW 1/4 18, 19 S., 11 E.	28X16X6 mm	C	N	
U8	Smith Cabin, north	NW 1/4 NW 1/4 NE 1/4 36, 20 S., 13 E.	68.4X65X31.4 mm	C	N	
U9	Smith Cabin	C N 1/2 N 1/2 5, 21 S., 14 E.	94X76X60 mm	C	N	
U10	Justensen Flats	SE 1/4 NW 1/4 3, 23 S., 9 E.	23.5X18.3X9.8 mm	C	N	
U11	Spotted Wolf Canyon	NE 1/4 SW 1/4 NE 1/4 12, 22 S., 13 E.	98.2X48.5X30.5 mm	C	N	
U12	Straight Wash	E 1/2 SW 1/4 NE 1/4 28, 23 S., 13 E.	ONM	C	N	
U13	Bull Bottom	SE 1/4 NW 1/4 NW 1/4 12, 24 S., 16 E.	21.4X12.6X9.7 mm	C	N	
U14	North Temple Wash	SE 1/4 SW 1/4 SE 1/4 1, 25 S., 11 E. (un)	9x6X6 mm	C	N	
U15	Temple Mountain	SE 1/4 NE 1/4 SW 1/4 11, 25 S., 11 E.	63.5X50.8X12.7 mm	C	N	
U16	Westwater Canyon	SW 1/4 SW 1/4 NE 1/4 16, 20 S., 25 E.	65.8X50X37.3 mm	C	N	
U17	Salt Valley	NE 1/4 SW 1/4 NW 1/4 32, 22 S., 20 E.	11.9X6.8X4.5 cm	C	N	Also includes a pebble, 91X61X21 mm, containing bits of bryozoan from Pz (D.A. Myers, oral commun., 1987).
U18	Red Wash	SE 1/4 SE 1/4 NW 1/4 3, 24 S., 17 E.	10.5X8.2X2.7 cm	C	N	
U19	Tenmile Butte	NW 1/4 NW 1/4 SE 1/4 27, 24 S., 18 E.	14.9X7.5X6 cm	C	N	
U20	Jug Rock Flat	SW 1/4 NW 1/4 NE 1/4 5, 25 S., 19 E. (un)	16.1X13.4X12.1 mm	C	N	
U21	Sevenmile Canyon	NW 1/4 SW 1/4 12, 25 S., 19 E. (un)	ONM	C	N	
U22	Mill Canyon	NW 1/4 NE 1/4 NW 1/4 29, 24 S., 20 E.	13.1X10.5X4.7 cm	C	N	
U23	Arches National Park	C SW 1/4 SE 1/4 24, 24 S., 21 E.	10 cm	C	N	
U24	Squaw Park	NW 1/4 SE 1/4 NW 1/4 10, 23 S., 23 E.	12.4X6.5X4.3 cm	C	N	
U25	Dewey Bridge	NW 1/4 SW 1/4 7, 23 S., 24 E.	ONM	C	N	
U26	Dewey Bridge, south	NE 1/4 SW 1/4 NW 1/4 17, 23 S., 24 E.	59X23X17.9 mm	C	N	
U27	Granite Creek	SE 1/4 NE 1/4 SE 1/4 9, 23 S., 25 E.	10.4X6X4 mm	C	N	
U28	Cottonwood Canyon	SE 1/4 SW 1/4 SE 1/4 23, 23 S., 24 E.	7.6X7.1X5.6 mm	C	Pz	
U29	Bridge Canyon	NE 1/4 SE 1/4 SW 1/4 5, 24 S., 25 E.	12.7X9.4X7.5 mm	C	N	
U30	Polar Mesa 2	SW 1/4 SE 1/4 NE 1/4 11, 25 S., 25 E. (un)	51.8X35X22 mm	C	Pz	
U31	Polar Mesa 1	NW 1/4 SW 1/4 NW 1/4 12, 25 S., 25 E. (un)	17.7X13.9X15.2 mm	C	Pz	
U32	Black Ridge	NW 1/4 SW 1/4 SE 1/4 17, 29 S., 4 E.	Grit to 3 mm	C	SU	B-Fred Peterson.
U33	Fremont River	C SW 1/4 NE 1/4 6, 29 S., 7 E.	8 mm	ND	SU	Do.
U34	Boulder	NE 1/4 SW 1/4 SE 1/4 34, 33 S., 4 E.	6 mm	ND	SU	Do.
U35	The Post	SW 1/4 SW 1/4 25, 34 S., 8 E.	50 mm	C	N	Do.
U36	Pine Creek	NE 1/4 SW 1/4 SW 1/4 29, 34 S., 3 E.	10 mm	C	N	Do.
U37	Escalante	SE 1/4 NW 1/4 SW 1/4 22, 35 S., 4 E.	20.5X12.6X6.4 mm	C	N	Do.
U38	Behind the Rocks 1	SE 1/4 NE 1/4 NE 1/4 17, 27 S., 22 E.	32X26X17 mm	C	N	
U39	Behind the Rocks 2	SE 1/4 NE 1/4 SW 1/4 21, 27 S., 22 E.	21X14X5.5 cm	C	N	
U40	Mill Creek	NE 1/4 SE 1/4 SE 1/4 5, 27 S., 23 E.	14.9X14.6X10.1 mm	C	N	
U41	Spanish Valley, south	NW 1/4 SW 1/4 SE 1/4 9, 27 S., 23 E.	69.1X58.7X32.6 mm	C	N	
U42	Behind the Rocks 5	SW 1/4 SE 1/4 SE 1/4 33, 27 S., 22 E.	64X34X51 mm	C	N	
U43	Behind the Rocks 6	SW 1/4 SE 1/4 NE 1/4 25, 27 S., 22 E.	19.5X11.3X6.2 cm	C	N	
U44	Behind the Rocks 4	SE 1/4 SE 1/4 NE 1/4 3, 28 S., 22 E.	56X35X30 mm	C	N	
U45	Kane Springs 1	NW 1/4 NW 1/4 NE 1/4 11, 28 S. 22 E.	42.1X24.3X23.5 mm	C	N	
U46	Kane Springs 2	NE 1/4 SW 1/4 SW 1/4 12, 28 S., 22 E.	81.5X42.9X30.6 mm	C	N	
U47	Flat Iron Mesa	C SW 1/4 NW 1/4 25, 28 S., 22 E.	38.9X26.5X18.3 mm	C	N	
U48	La Sal Creek	NE 1/4 SE 1/4 NE 1/4 32, 28 S., 26 E.	9.5 mm	C	N	Includes clear quartzite pebbles from Pz.
U49	Hatch Point 1	SW 1/4 NW 1/4 SW 1/4 6, 29 S., 22 E.	50.8X38.1X12.7 mm	C	N	
U50	Hatch Point 2	NE 1/4 NE 1/4 SW 1/4 31, 29 S., 22 E.	25.4X15.8X9.5 mm	C	N	
U51	Hatch Rock	SW 1/4 SE 1/4 SE 1/4 35, 29 S., 22 E.	83.9X41.3X28.7 mm	C	N	
U52	Wilson Arch	SE 1/4 SE 1/4 SW 1/4 15, 29 S., 23 E.	20.1X17.2X12.5 mm	C	N	
U53	Hook and Ladder	NW 1/4 SW 1/4 NE 1/4 25, 29 S., 23 E.	23.8X23X13.4 mm	C	N	
U54	Wind Whistle	SE 1/4 NW 1/4 NW 1/4 13, 30 S., 22 E. (un)	56.7X54.4X29.7 mm	C	N	
U55	Wind Whistle Rock	C NE 1/4 NE 1/4 23, 30 S., 22 E. (un).	58.3X49.5X35.2 mm	C	N	
U56	Rone Bailey	C NW 1/4 SE 1/4 24, 30 S., 22 E. (un)	32.5X20.5X25.6 mm	C	N	
U57	Dry Valley 2	NE 1/4 NE 1/4 SE 1/4 36, 30 S., 22 E.	44X18.6X18.1 mm	C	N	
U58	Lopez Gulch	SE 1/4 NW 1/4 NE 1/4 12, 30 S., 23 E.	46X41X21 mm	C	N	Includes pebbles as wide as 41 mm from Pz.
U59	Casa Colorado	SW 1/4 NE 1/4 SE 1/4 17, 30 S., 24 E.	13.3X7.2X3.1 cm	C	N	
U60	Dry Valley, 3X	SE 1/4 NE 1/4 NW 1/4 35, 30 S., 24 E.	16.8X21.4X12.3 mm	C	N	
U61	Big Indian Rock	SE 1/4 SE 1/4 NW 1/4 36, 30 S., 24 E.	32.6X28X15.9 mm	C	N	
U62	Lone Cedar Draw	NW 1/4 NW 1/4 NE 1/4 18, 31 S., 23 E.	11.9X9.8X9.1 mm	C	N	
U63	Photo Gap	SW 1/4 NE 1/4 SE 1/4 29, 31 S., 23 E.	13.9X13.4X12.1 mm	C	N	
U64	East Canyon Wash	C NE 1/4 SW 1/4 10, 31 S., 24 E.	68.4X40.4X49.2 mm	C	N	
U65	Three Step Hill, west	NW 1/4 NW 1/4 SW 1/4 2, 31 S., 25 E.	46.9X43.4X24.1 mm	C	N	
U66	Three Step Hill, east	SE 1/4 SE 1/4 SE 1/4 1, 31 S., 25 E.	58.3X32.3X20.6 mm	C	N	
U67	Harts Draw	NW 1/4 NE 1/4 NW 1/4 35, 32 S., 22 E.	25.5X22.6X11.5 mm	C	N	
U68	Shay Mountain	SE 1/4 SE 1/4 NE 1/4 14, 33 S., 21 E. (un)	84X49X53 mm	C	N	
U69	Indian Creek, west	NW 1/4 SE 1/4 SE 1/4 7, 33 S., 22 E. (un)	14X11.7X7.8 mm	C	N	
U70	Indian Creek, east	SE 1/4 SW 1/4 NE 1/4 9, 33 S., 22 E. (un)	41.1X21.7X18.3 mm	C	N	
U71	The Causeway	NE 1/4 NE 1/4 16, 34 S., 21 E. (un)	53.5X31.8X23.7 mm	C	N	
U72	Dry Wash	NE 1/4 NE 1/4 25, 34 S., 21 E. (un)	29.2X27.1X22 mm	C	N	
U73	Montezuma Canyon	NE 1/4 NE 1/4 NW 1/4 14, 35 S., 24 E.	45X43X26 mm	C	N	B-M.W. Green.
U74	Mancos Jim Butte	NE 1/4 NW 1/4 SE 1/4 21, 35 S., 21 E.	44.8X30.5X23.1 mm	C	N	
U75	Allen Canyon	NW 1/4 NE 1/4 SE 1/4 29, 35 S., 21 E.	20.3 cm	C	N	
U76	Cedar City	SE 1/4 SW 1/4 SE 1/4 12, 36 S., 11 W.	Grit to 2 mm	ND	SU	B-Fred Peterson.
U77	Seep Flat	SW 1/4 NE 1/4 6, 37 S., 5 E. (un)	23X14X12 mm	C	N	B-H.D. Zeller.
U78	Harris Wash	SW 1/4 SE 1/4 SW 1/4 33, 36 S., 5 E.	8 mm	ND	SU	B-Fred Peterson.
U79	Egypt	15, 37 S., 6 E. (un)	6 mm	ND	SU	B-Fred Peterson.
U80	Indian Village	SE 1/4 Lot 2, 6, 36 S., 21 E.	35.9X30.5X12 mm	C	N	
U81	Hammond Canyon	SE 1/4 SW 1/4 NW 1/4 7, 36 S., 21 E.	27.7X13.6X10 mm	C	N	
U82	Cottonwood Wash	SE 1/4 SE 1/4 NW 1/4 7, 36 S., 21 E.	35.4X31.9X15.1 mm	C	N	
U83	Blanding	SW 1/4 NW 1/4 NW 1/4 7, 37 S., 21 E.	16X6X5 mm	C	N	
U84	Gunlock	SW 1/4 SW 1/4 NE 1/4 32, 40 S., 17 W.	Grit to 3 mm	ND	SU	
U85	Leeds	NE 1/4 SW 1/4 NE 1/4 34, 40 S., 14 W.	Grit to 3 mm	ND	SU	B-Fred Peterson.
U86	Pocket Mesa	NW 1/4 NE 1/4 NE 1/4 34, 39 S., 11 W.	Grit to 2 mm	ND	SU	Do.
U87	Potato Hollow	NE 1/4 NE 1/4 NW 1/4 20, 40 S., 10 W.	5 mm	ND	SU	Do.
U88	Zican Lodge	SW 1/4 SE 1/4 SW 1/4 16, 41 S., 9 W.	Grit to 3 mm	ND	SU	Do.
U89	Mount Carmel Junction	SW 1/4 SW 1/4 SE 1/4 25, 41 S., 8 W.	Grit to 3 mm	ND	SU	Do.
U90	Brown Canyon	NE 1/4 SE 1/4 NW 1/4 19, 41 S., 5 W.	Grit to 3 mm	ND	SU	Do.
U91	Willis Creek	24, 38 S., 3 W.	6 mm	ND	SU	Do.
U92	Bull Valley Gorge	SW 1/4 SW 1/4 NW 1/4 27, 38 S., 3 W.	5 mm	ND	SU	Do.
U93	Rush Beds	NW 1/4 SW 1/4 SW 1/4 10, 39 S., 1 W. (un)	Grit to 3 mm	ND	SU	Do.
U94	Cat Pasture	C NW 1/4 NW 1/4 26, 38 S., 6 E.	6 mm	ND	SU	Do.
U95	Early Weed Bench	6, 38 S., 7 E. (un)	6 mm	ND	SU	Do.
U96	Hurricane Wash	26, 39 S., 7 E.	Grit to 4 mm	ND	SU	Do.
U97	Cave Point	SE 1/4 NE 1/4 SW 1/4 26, 40 S., 8 E.	25 mm	ND	SU	Do.
U98	Butler Wash 1	NE 1/4 SW 1/4 NE 1/4 18, 37 S., 21 E.	96.9X59.6X55 mm	C	N	
U99	Butler Wash 2	NE 1/4 SW 1/4 NW 1/4 20, 37 S., 21 E.	10.3X6.9X4.7 cm	C	N	
U100	Butler Wash 3	SW 1/4 NE 1/4 SW 1/4 5, 38 S., 21 E.	51.9X37.2X35 mm	C	N	
U101	Butler Wash 4	NW 1/4 NW 1/4 SW 1/4 17, 38 S., 21 E.	43.4X27.5X23.9 mm	C	N	
U102	Butler Wash 5	NW 1/4 SW 1/4 SW 1/4 5, 39 S., 21 E.	67.9X51.2X40 mm	C	N	
U103	Butler Wash 6	NW 1/4 NE 1/4 NE 1/4 31, 40 S., 21 E.	40x20.3X14.6 mm	C	N	
U104	Rock Creek	111°09'07", 37°09'40"	20 mm	ND	SU	
U105	Sixtymile Point	SE 1/4 NE 1/4 SW 1/4 6, 42 S., 9 E.	Grit to 4 mm	ND	SU	
U106	Paria River	SE 1/4 NW 1/4 15, 43 S., 1 W.	10 mm	C	N	B-Fred Peterson.
U107	Jacobs Tanks	C SW 1/4 15, 43 S., 2 E.	5 mm	ND	SU	Do.
U108	Gunsight Canyon	SE 1/4 SE 1/4 SE 1/4 34, 43 S., 5 E.	6 mm	ND	SU	Do.
		WYOMING				
W1	Clarks Fork Canyon	C W 1/2 NW 1/4 5, 56 N., 103 W.	13X8X5 mm	Ls	G	
W2	Sykes Mountain	SE 1/4 SE 1/4 SW 1/4 7, 57 N., 94 W.	54X35X17 mm	C	G	Also pebbles from Pz.
W3	Beaver Creek	SW 1/4 1, 55 N., 64 W.	45.6 cm	C, Ls	G	Mapel and Bergendahl (1956, p. 88).
W4	Hulett	SW 1/4 NW 1/4 SW 1/4 2, 54 N., 64 W.	12 mm	C	G	
W5	Sundance Mountain	NE 1/4 25, 51 N., 63 W.	50 mm	C	G	
W6	Crystal Creek	NE 1/4 NW 1/4 NE 1/4 18, 54 N., 93 W.	80X53X35 mm	C	G	
W7	Cody	NE 1/4 3, 52 N., 102 W.	35X26X17 mm	C	G	
W8	Shell	C E 1/2 3, 51 N., 91 W.	64X44X18 mm	C	G	
W9	North Fork Sayles Creek	SE 1/4 SW 1/4 SE 1/4 6, 51 N., 83 W.	63X43X14 mm	C	G	
W10	Elgin Creek	SW 1/4 NE 1/4 NW 1/4 14, 49 N., 83 W.	77X43X26 mm	C	G	
W11	Dry Muddy Creek	NE 1/4 SW 1/4 2, 48 N., 83 W.	10.5X8.3X3.4 cm	C	G	
W12	Tensleep	NE 1/4 10, 47 N., 89 W.	88X46X37 mm	C	G	
W13	Ramsbottom Ranch	SW 1/4 NE 1/4 SW 1/4 23, 46 N., 83 W.	5 mm	C	G	
W14	Otter Creek	SW 1/4 9, 45 N., 87 W.	57X38X16 mm	C	G	
W15	Mayoworth	SW 1/4 SW 1/4 NW 1/4 3, 44 N., 83 W.	46X34X33 mm	C	G	Also includes pebbles from Pz.
W16	South Fork Owl Creek	C N 1/2 NW 1/4 1, 8 N., 1 E.	LFNF			
W17	Thermopolis	SE 1/4 NW 1/4 SW 1/4 19, 43 N., 94 W.	50X25X5 mm	C	G	
W18	Thermopolis, northwest	SW 1/4 NE 1/4 NW 1/4 24, 43 N., 95 W.	Grit	C, Q	SU	
W19	Wild Horse Butte	SE 1/4 NW 1/4 NW 1/4 34, 43 N., 93 W.	53X47X17 mm	C	G	
W20	Redbank School	E 1/2 18, 43 N., 87 W.	ONM	C	G	
W21	Minecke Draw	NW 1/4 NW 1/4 36, 43 N., 84 W.	43X35X13 mm	C	G	
W22	Red Creek	SE 1/4 SE 1/4 SE 1/4 6, 6 N., 3 W.	33X27X15 mm	C	G	
W23	Nowood	NE 1/4 2, 41 N., 89 W.	51X31X19 mm	C	G	
W24	Deadman Butte	SE 1/4 NW 1/4 NE 1/4 24, 38 N., 87 W.	18X15X6 mm	C	G	
W25	Bull Lake	SW 1/4 NE 1/4 SE 1/4 36, 3 N., 4 W.	ONM	ND	SU	
W26	North Fork Sage Creek	SE 1/4 SW 1/4 NE 1/4 17, 2 N., 3 W.	18X16X9 mm	Q_3	G	
W27	South Fork Sage Creek	SE 1/4 SE 1/4 NE 1/4 3, 1 N., 3 W.	30X26X7 mm	C	G	
W28	Peevah Creek	SW 1/4 NW 1/4 SW 1/4 13, 1 N., 3 W.	17X18X13 mm	C	G	
W29	Juniper Butte	C S 1/2 S 1/2 SE 1/4 17, 1 N., 1 W.	38X20X12 mm	C	G	
W30	Sage Creek anticline, north	NE 1/4 NE 1/4 SE 1/4 16, 1 N., 1 W.	96X82X18 mm	C	G	
W31	South Fork Little Wind River	SE 14/ SE 1/4 NE 1/4 4, 1 S., 2 W.	55X47X32 mm	C	G	
W32	Sage Creek anticline, south	C N 1/2 NW 1/4 NE 1/4 7, 1 S., 1 E.	80X35X33 mm	C	G	
W33	Mill Creek	SE 1/4 SE 1/4 NW 1/4 5, 2 S., 1 W.	33X21X16 mm	C	G	
W34	Baldwin Creek	SE 1/4 SE 1/4 SE 1/4 8, 33 N., 100 W.	38X24X20 mm	C	G	
W35	Lander	SE 1/4 SW 1/4 NE 1/4 13, 2 S., 1 E.	37X26X15 mm	C	G	
W36	Connant Creek	SW 1/4 SW 1/4 NE 1/4 26, 33 N., 94 W.	25X21X15 mm	C.	G	
W37	Gas Hills	SW 1/4 NW 1/4 NW 1/4 14, 33 N., 90 W.	5 mm	Q, C	SU	
W38	J E Ranch	NE 1/4 SE 1/4 SE 1/4 30, 34 N., 88 W.	Grit	Q, C	SU	
W39	Dallas anticline	NW 1/4 NE 1/4 SW 1/4 12, 32 N., 99 W.	19 mm	C	G	
W40	Derby dome	SW 1/4 NE 1/4 NW 1/4 33, 32 N., 98 W.	76 mm	C	G	
W41	Sheep Mountain	NE 1/4 NE 1/4 NW 1/4 29, 31 N., 97 W.	15X10X9 mm	C	G	
W42	Beaver Creek (Halley)	NE 1/4 NE 1/4 NE 1/4 2, 30 N., 97 W.	56X39X15 mm	C	G	
W43	Bessemer Mountain	SE 1/4 SE 1/4 SE 1/4 16, 32 N., 81 W.	25.4 mm	C	G	
W44	Alcova, northwest	NE 1/4 NW 1/4 SW 1/4 10, 30 N., 83 W.	18X17X5 mm	C	G	
W45	Alcova, southeast	SE 1/4 SW 1/4 NW 1/4 29, 30 N., 82 W.	Grit to 4 mm	Q, C	G	
W46	Garrett Ranch	C N 1/2 NE 1/4 NW 1/4 12, 30 N., 80 W.	ONM	ND	SU	
W47	Douglas	C N 1/2 7, 31 N., 71 W.	53X36X9 mm	C	G	
W48	Sage Hen anticline	NW 1/4 SE 1/4 SE 1/4 20, 31 N., 72 W.	Grit	Cl	TR	
W49	Sheep Creek anticline	SE 1/4 SE1/4 NE 1/4 15, 28 N., 92 W.	Grit	ND	SU	
W50	Green Mountain	NE 1/4 SE 1/4 SW 1/4 18, 28 N., 91 W.	Grit	ND	G	
W51	Horseshoe Creek	SE 1/4 SE 1/4 SE 1/4 33, 29 N., 69 W.	6 mm	ND	SU	
W52	Ferris Mountain, west	C E 1/2 NW 1/4 SW 1/4 18, 27 N., 88 W.	16X11X6 mm	C	SU	Includes pink pebbles from N.
W53	Ferris Mountain, east	N 1/2 SW 1/4 9, 26 N., 87 W.	28X18X5 mm	C	G	
W54	Freezeout Hills, northeast	C N 1/2 S 1/2 SW 1/4 33, 26 N., 79 W.	Grit	C	SU	
W55	Sheep Creek	NW 1/4 SW 1/4 NE 1/4 35, 26 N., 76 W.	LFNF			
W56	Hurt Creek	NE 1/4 NW 1/4 NW 1/4 24, 25 N., 85 W.	Grit	C	SU	
W57	Sips Creek	NE 1/4 NE 1/4 NW 1/4 24, 25 N., 84 W.	ONM	ND	SU	
W58	Troublesome Creek	W 1/2 NE 1/4 29, 25 N., 81 W.	Grit	C	SU	
W59	Mud Spring	N 1/2 N 1/2 SE 1/4 34, 25 N., 81 W.	Grit	C	SU	
W60	Freezeout Hills, east	NE 1/4 NE 1/4 SE 1/4 30, 25 N., 78 W.	ONM	C	SU	
W61	Freezeout Hills, southwest	SE 1/4 NE 1/4 NE 1/4 26, 24 N., 80 W.	ONM	C	SU	
W62	Bell Springs	C W 1/2 NW 1/4 SE 1/4 9, 23 N., 88 W.	Grit to 4 mm	C	G	
W63	Rawlins, northeast	NW 1/4 NE 1/4 NE 1/4 36, 22 N., 87 W.	ONM	C	SU	
W64	Rattlesnake Creek	SW 1/4 SE 1/4 26, 20 N., 82 W.	LFNF			
W65	Farthing	NW 1/4 NE 1/4 SW 1/4 3, 18 N., 70 W.	ONM	ND	SU	
W66	Littlefield Creek	C W 1/2 NE 1/4 NW 1/4 11, 17 N., 89 W. (un)	ONM	ND	SU	
W67	Sage Creek Basin	SW 1/4 NE 1/4 NE 1/4 27, 17 N., 88 W.	Grit	Q, C	SU	
W68	Horse Creek	SW 1/4 NE 1/4 SE 1/4 34, 17 N., 70 W.	12 mm	C	SU	
W69	Mesa Mountain	SW 1/4 NE 1/4 SW 1/4 35, 16 N., 70 W.	7X4X3.5 mm	C	G	
W70	Big Sandstone Creek	E 1/2 SE 1/4 NE 1/4 19, 14 N., 87 W.	Grit	C	SU	
W71	Roaring Fork	SW 1/4 SE 1/4 NE 1/4 8, 12 N., 86 W.	Grit	ND	SU	
W72	Red Mountain	NE 1/4 SW 1/4 NW 1/4 16, 12 N., 76 W.	10 mm	C	G	
W73	Red Mountain, south	NE 1/4 SE 1/4 NE 1/4 21, 12 N., 76 W.	Grit	ND	SU	

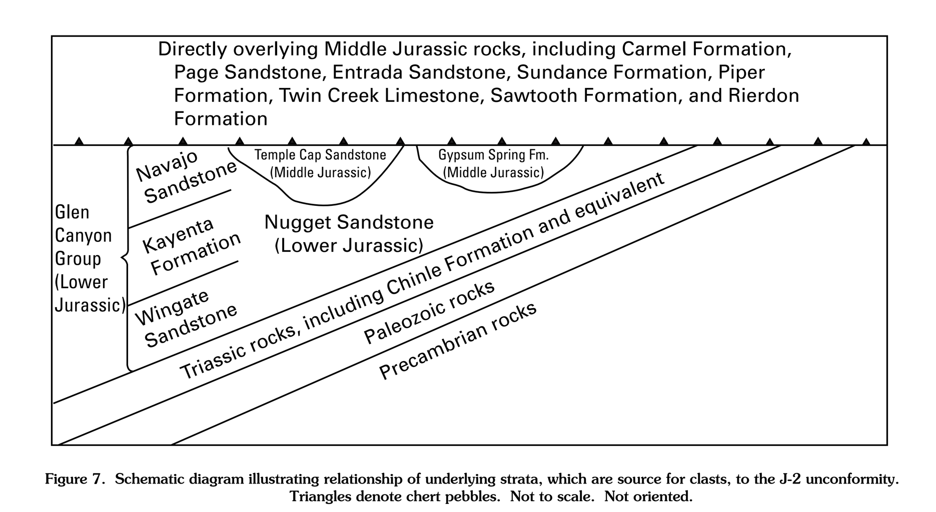

Figure 7. Schematic diagram illustrating relationship of underlying strata, which are source for clasts, to the J-2 unconformity. Triangles denote chert pebbles. Not to scale. Not oriented.

MAPS SHOWING DISTRIBUTION OF EROSIONAL CLASTS ON THE MIDDLE JURASSIC J-2 UNCONFORMITY IN THE WESTERN INTERIOR OF THE UNITED STATES

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