

BULLETIN 4
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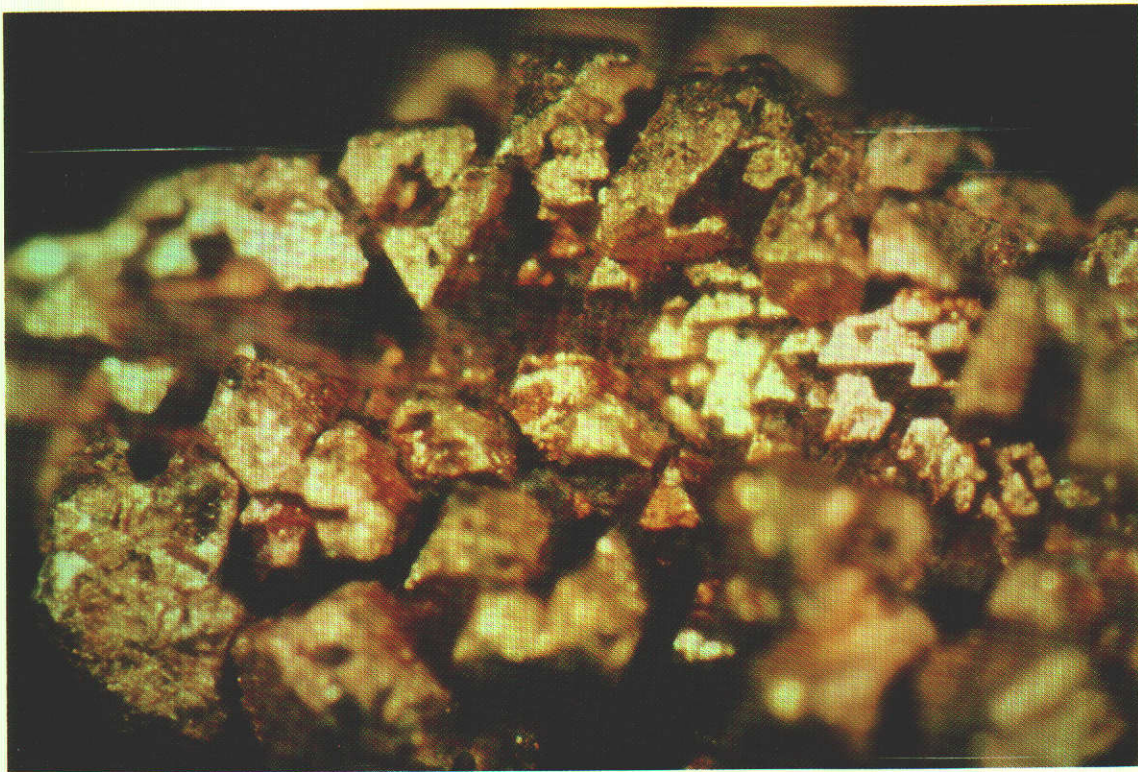
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SEDIMENTOLOGY OF PLACER GRAVELS NEAR MT. NANSEN CENTRAL YUKON TERRITORY



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FACIES SCHEME

Introduction

The term "facies" has generally been used by various authors as the classification of a body of rock or sediment based on a unique set of characteristics that set it apart from other bodies of rock or sediment. Modern usage originated with de Raaf *et al.*, (1965) who used "lithological, structural and organic aspects detectable in the field" to subdivide a group of formations into facies. Walker (1984) noted that this subdivision is essentially a classification procedure which depends on the objectives of the study as well as the time available and the abundance of physical and biological structures in the rocks. Middleton (1978) noted that although facies will ultimately be given an environmental interpretation, the facies definition must be quite objective and based on the total field aspect of the rocks themselves.

The facies scheme utilized in the study area was designed with the above in mind. It was revised

throughout the field season and adjusted as new lithologies were encountered. The objectives of the study were constantly kept in mind so that the facies scheme would be neither too simplistic nor too complex to achieve the goals of the study in the amount of time available. Although several facies occurred in widely varying genetic settings, care was taken not to add environmental interpretation into the facies descriptions.

The main characteristics of each bed which were described in the field were: lithology (percent of gravel, sand, silt and clay), maximum grain size (based on ten largest clasts), clast angularity, sedimentary structures, clast support, sorting, contacts, and accessories. Gravel and sand units were described according to the modified Wentworth scale (Wentworth, 1922) and classified according to the AGI (American Geological Institute) classification scheme (Detrich *et al.*, 1982). Table 6 summarizes the main aspects of each facies described.



Figure 11 - Measured section K 1-3 shows one of several buried organic horizons (Facies 1) in the Klaza River locality. Note the stump in growth position, which has been radiocarbon dated at 4600a +/- 60 B.P.



Figure 12 - Facies 2, a convoluted, faulted tephra, lies beneath several feet of mud and fine sand at Eva Creek, measured section EVA 2-1. This unit is also exposed similarly in upper Discovery Creek. White River Ash caps the sequence near the present topographical surface.

General Facies Descriptions

Facies 1 - Organic

This facies (shown in Figure 11) includes recent and older organic material. Organic grade varies from present day and Holocene plant material to fibric peat material found lower in most sections. A total of 41 beds were encountered, comprising 15.24% of the total beds measured. The following sections contained Facies 1: LBAC 1-1, LBAC 2-2, UBAC 1-1, EFN 1-1, EFN 2-2, EFN 3-1, EFN 3-2, EFN 4-1, WEB 1-1, WEB 2-1, K 1-1, K 1-2, K 1-3, K 2-1, EVA 1-1, EVA 2-1, DIS 1-1, DIS 1-2, DIS 1-3, DIS 2-1, DIS 2-9, DIS 2-11, DIS 2-12, LDIS 1-1, VIC 1-1, VIC 1-2, VIC 1-3, NAN 1-1, DOL 1-1.

Facies 2 - Tephra

Two tephra are present. The most recent, found near the present day surface, is the White River Ash (Lerbekmo and Campbell, 1969; Lerbekmo *et al.*, 1975). Its grain size is generally medium sand and it is overlain in most areas by only a few centimetres of organic material. The second tephra (Figure 12) is found associated with silts and fine sands within one metre of the present day surface. It is occasionally found in the same sections as the White River Ash. This ash has yet to be dated. A total of 18 beds were encountered, comprising 6.69% of total beds measured. The following sections contained Facies 2: LBAC 1-1, LBAC 2-2, EFN 1-1, EFN 2-2, WEB 2-1, K 2-1, 1-1, EVA 1-1, EVA 2-1, DIS 1-1, DIS 1-2, DIS 2-1, DIS 2-11, VIC 1-1, VIC 1-2, VIC 1-3.

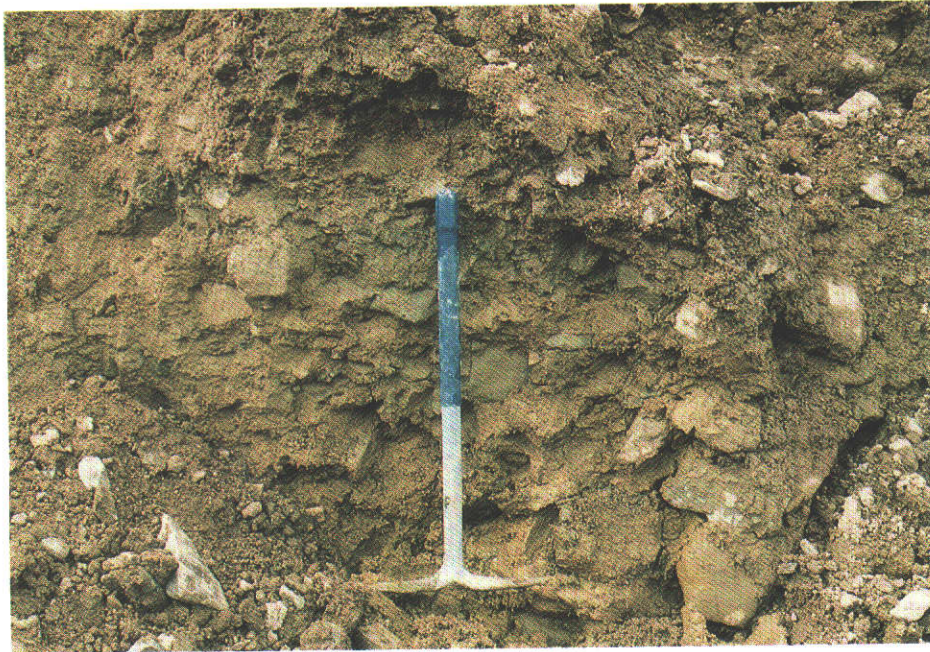


Figure 13 - Facies 3, disorganized cobble-boulder diamicton, occurs in the Klaza River locality, section K 2-1, unit A. Some placer gold has been mined from this unit. The pick is 65 cm long.



Figure 14 - An unusual stratified pebbly diamicton is overlain by colluvium on the East Fork of Nansen Creek. The unit is clay-rich, contains weathered granodiorite clasts and has strata that dip uphill.



Figure 15 - Cobbly diamicton of Facies 3 occurs on Nansen Creek, measured section NAN 1-1. This clay-rich unit contains numerous weathered clasts and significant placer gold concentrations.

Facies 3 - Diamicton

This unit varies from clast- to matrix-supported, is disorganized and contains pebble to boulder size clasts in a matrix of clay, silt, and sand. Some units are mud-dominated and some are sand-dominated. It is very poorly sorted, and clasts are angular to subrounded. In many sections this facies is gold-bearing and is mined as the pay unit (Figures 13 and 15). A total of 19 beds were encountered, comprising 7.06% of total beds measured. The following sections contained Facies 3: EFN 3-1, EFN 3-2, WEB 1-1, K 2-1, NAN 1-1, UBAC 1-1.

Facies 4 - Massive and stratified silt and clay

This unit is composed of disorganized and massive to stratified silt and clay, with varying amounts of other minor components including sand and tephra (Figure 16). Pebbles and cobbles comprise less than 25%. A total of 14 beds were encountered, comprising 5.20% of total beds measured. The following sections contained Facies 4: K 1-1, K 1-2, K 1-3, K 2-1, EVA 1-1, EVA 2-1, DIS 1-1, DIS 1-2, DIS 2-1, DIS 2-11, LDIS 1-1.



Figure 16 - Stratified silt and clay of Facies 4 overlies disorganized pebble-cobble gravel of Facies 9 at Eva Creek section EVA 1-1, and is in turn overlain by White River Ash. Traces of an older tephra are mixed with the silt and clay.

Facies 5 - Massive and disorganized pebbly sand and sand

This facies is composed of massive to disorganized, poorly- to well-sorted fine to coarse sand (Figure 19). Other fine sediments occur in minor amounts such as mud and tephra. Pebbles and cobbles occur in amounts of less than 25%. A total of 13 beds were encountered, comprising 4.83% of total beds measured. The following sections contained Facies 5: MBAC 1-1, EFN 2-2, WEB 1-1, WEB 2-1, EVA 2-1.

Facies 6 - Stratified pebbly sand and sand

This facies is composed of moderately to well-sorted fine to coarse granular sand with less than 25% pebbles and cobbles. Sedimentary structures include wavy and parallel stratification, planar tabular cross-beds (Figure 17), trough cross-beds, current ripples and convoluted bedding. A total of 34 beds were encountered, comprising 12.64% of total beds measured. The following sections contained Facies 6: LBAC 1-1, LBAC 2-2, MBAC 1-1, EFN 1-1, EFN 2-2, WEB 1-1, WEB 2-1, EVA 2-1, DIS 1-1, DIS 1-2, DIS 1-3, DIS 2-1, DIS 2-9, LDIS 1-1, VIC 1-1, VIC 1-2, VIC 1-3, K 1-2, NAN 1-1, DOL 1-1.

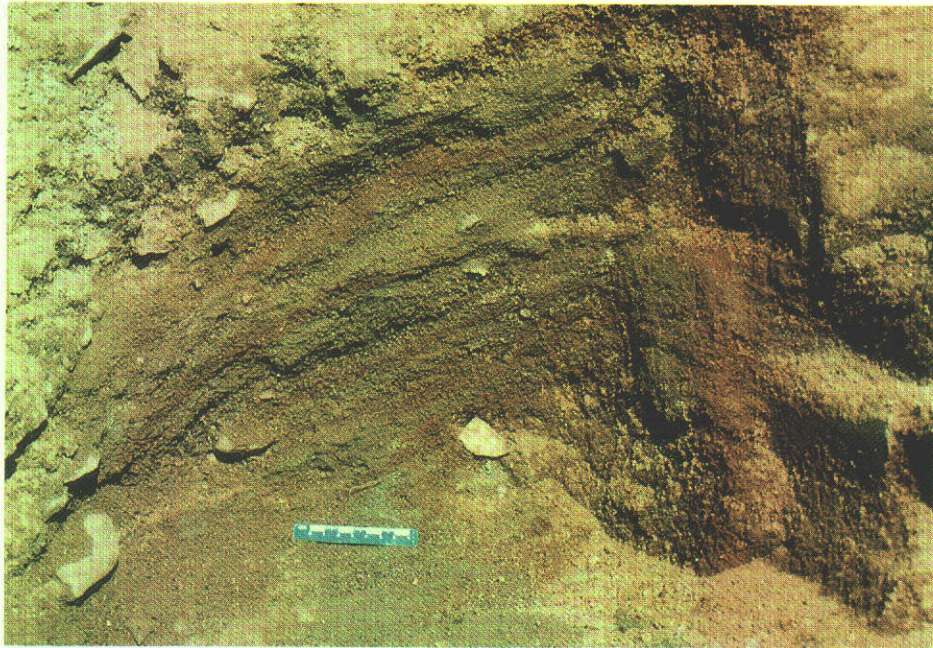


Figure 17 - Planar tabular cross-stratified pebbly sand (Facies 6) is truncated by pebble cobble gravel of Facies 10 on measured section DIS 1-3, upper Discovery Creek.

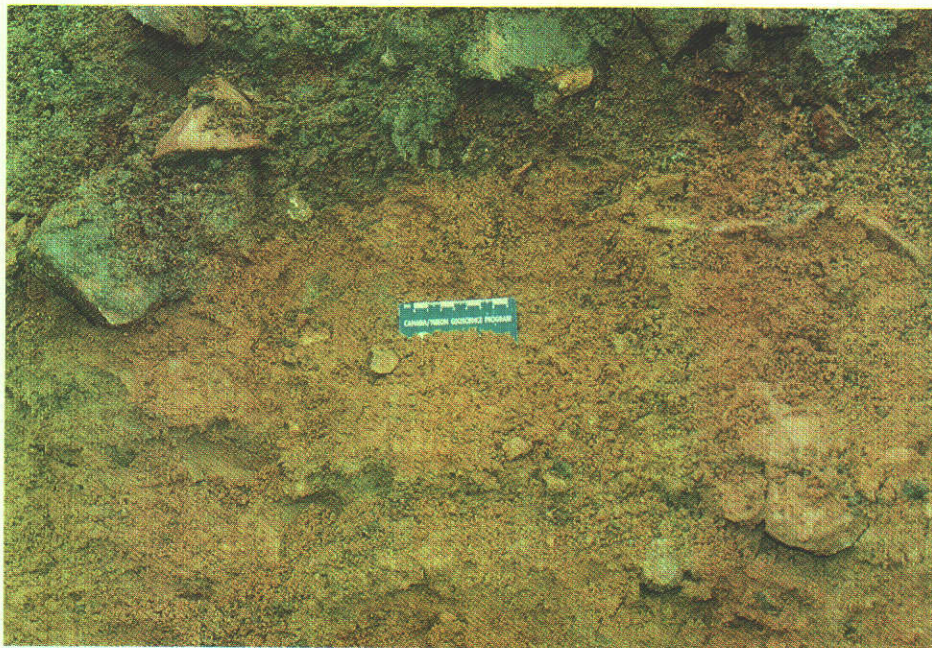


Figure 18 - Disorganized muddy pebble-cobble gravel of Facies 7 conformably overlies sandy pebble gravel of Facies 8 at measured section EVA 2-1, Eva Creek.



Figure 19 - Massive pebbly sand of Facies 5 and massive sandy pebble-cobble gravel of Facies 8 are intercalated on an alluvial fan in the mid-reaches of Discovery Creek, section LDIS 1-1.



Figure 20 - Disorganized gravel of Facies 9 overlies stratified gravel of Facies 10 at measured section EFN 2-1, on the East Fork of Nansen Creek. This section is highly weathered and is interpreted as pre-Reid glaciofluvial outwash.



Figure 21 - A pre-Reid glaciofluvial channel (measured section DIS 2-9) cuts bedrock at an elevation of 4270 feet on upper Discovery Creek.

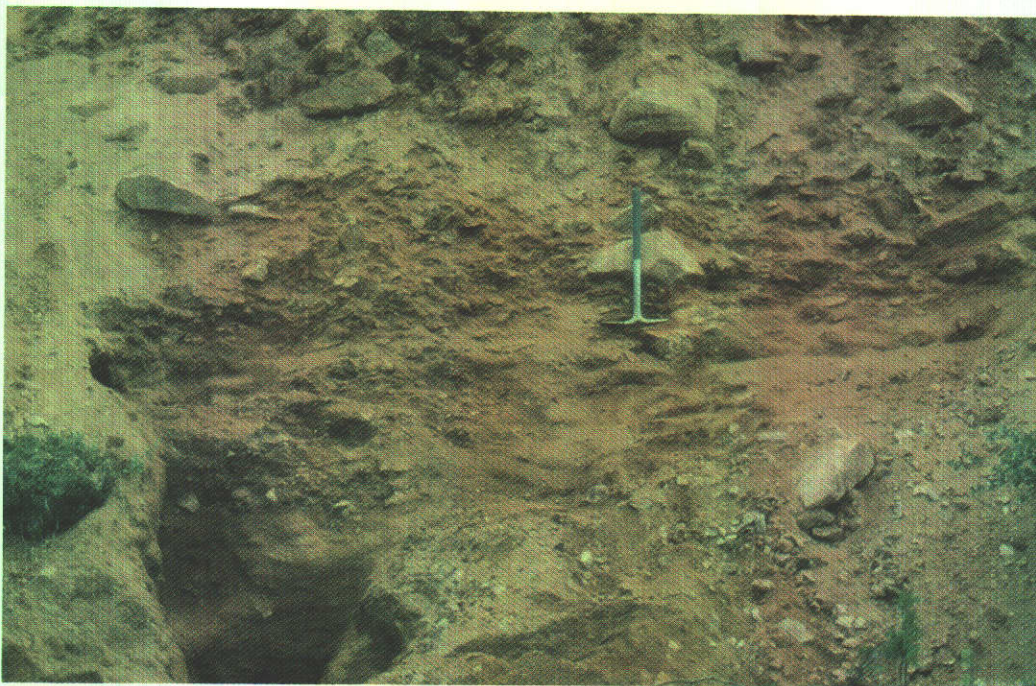


Figure 22 - A close-up of measured section DIS 2-9 shows massive to crudely stratified boulder-cobble gravel of Facies 10. Measured fabric in this highly weathered section shows a paleoflow direction which is transverse to the present valley.

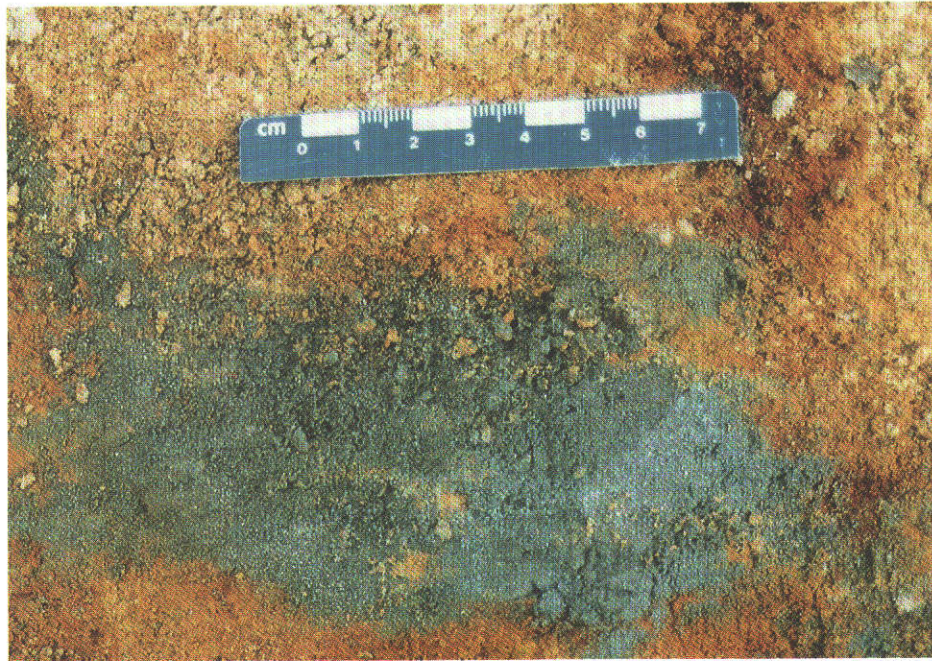


Figure 23 - Weathered arsenopyrite and pyrite occur in clay-altered pods in the bedrock near measured section DIS 2-9. Sulphides can be excavated as medium sand-sized grains.

Facies 7 - Disorganized muddy gravel

This facies is composed of gravels containing between 25% and 50% clasts and more clay and silt than sand. Strata are disorganized or crudely stratified and the units are mainly matrix-supported (Figure 18). Clasts vary from pebbles to cobbles and sorting is poor to moderate. A total of 7 beds were encountered, comprising 2.60% of total beds measured. The following sections contained Facies 7: K 2-1, EVA 1-1, EVA 2-1, EFN 2-1, EFN 2-2.

Facies 8 - Massive and stratified sandy gravel

This facies is composed of gravels containing between 25% and 50% clasts and more sand than clay and silt. Strata are massive, disorganized, or stratified and units are matrix- to clast-supported (Figures 18 and 19). Clasts vary from pebbles to boulders and sorting is poor to moderate. A total of 35 beds were encountered, comprising 13.01% of total beds measured. The following sections contained Facies 8: LBAC 2-2, MBAC 1-1, EFN 1-1, EFN 2-1, EFN 2-2, EFN 3-1, EFN 3-2, WEB 1-1, WEB 2-1, K 1-2, K 1-3, K 2-1, EVA 2-1, DIS 1-1, DIS 1-2, DIS 1-3, DIS 2-11, LDIS 1-1, DOL 1-1.

Facies 9 - Disorganized gravel

This facies is composed of gravels containing over 50% clasts. Units are disorganized and clast-to matrix-supported, and clast size includes pebbles, cobbles and boulders (Figure 20). Sorting is generally moderate. A total of 17 beds were encountered, comprising of 6.32% of total beds measured. The following sections contained Facies 9: EFN 1-1, EFN 2-1, EFN 2-2, K 2-1, EVA 1-1, DIS 1-1, DIS 1-3, VIC 1-3, NAN 1-1, DOL 1-1.

Facies 10 - Massive to crudely stratified gravel

This facies is composed of gravels containing over 50% clasts. Units are massive to crudely stratified and clast-supported, and clast size ranges from pebbles to boulders (Figures 20 to 23). Units are moderately to well-sorted. A total of 71 beds were encountered, comprising 26.39% of total beds measured. The following sections contained Facies 10: LBAC 1-1, 2-2, MBAC 1-1, UBAC 1-1, EFN 1-1, EFN 2-1, EFN 4-1, K 1-1, K 2-1, DIS 1-1, DIS 1-2, DIS 1-3, DIS 2-1, DIS 2-9, DIS 2-11, DIS 2-12, LDIS 1-1, VIC 1-1, VIC 1-2, VIC 1-3, NAN 1-1, WEB 1-1.

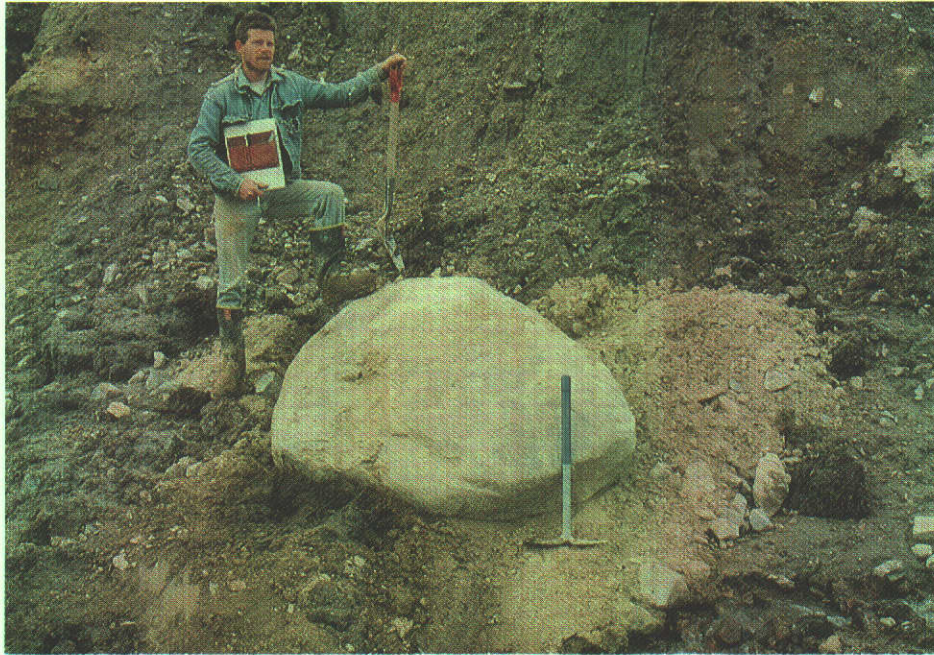


Figure 33 - A large bullet-shaped boulder was exposed by placer mining operations at an elevation of 4300 feet ASL on Back Creek. This streamlined boulder was derived from a diamicton which lay directly on bedrock. The diamicton in this location is interpreted as a glacial till.

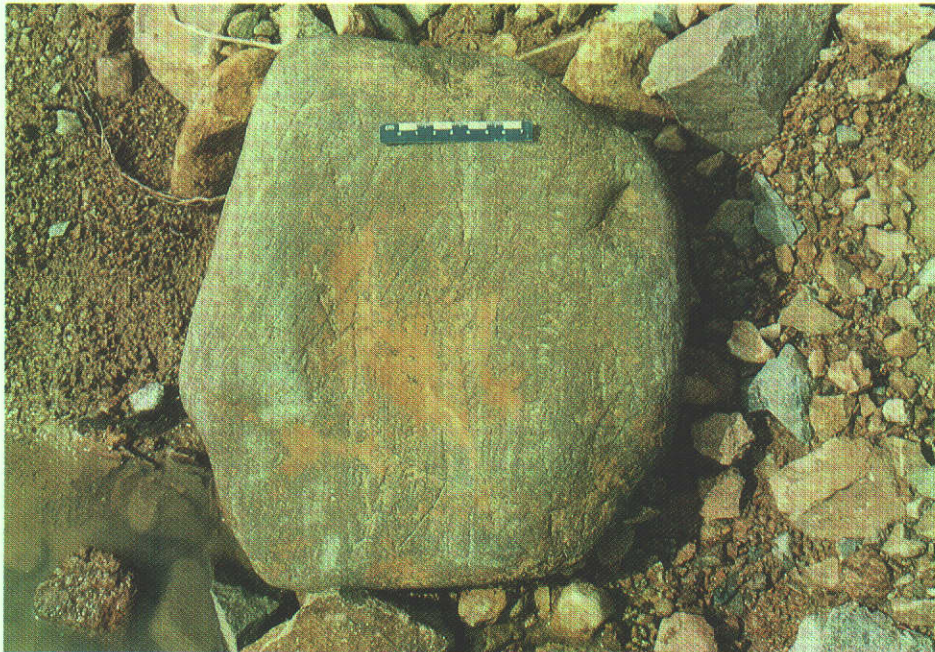


Figure 34 - Glacially-striated boulders also occur on the East Fork of Nansen Creek.

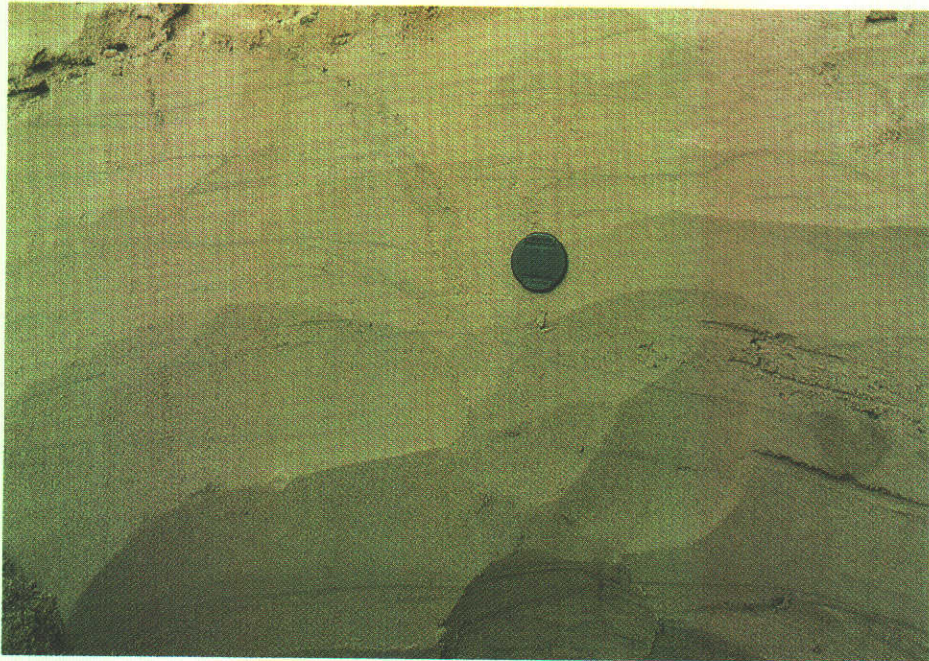


Figure 35 - Stratification consists of wavy parallel and ripple laminations in measured section WEB 2-1, located on a remnant alluvial terrace. An ice cast sand wedge can be discerned near the lens cap.



Figure 36 - A remnant alluvial terrace on the upper reach of Weber Creek has been dissected by the present stream, near the locality for measured section WEB 1-1.



Figure 37 - Interbedded cross-stratified sand and gravel occur in a remnant alluvial terrace on Weber Creek. Gravel clasts are angular, ventifacts are common and fine to medium sand is well-sorted. Measured section WEB 2-1.

Schematic Profiles and Lateral Relationships

Introduction

Figures 38 to 47 show schematic profiles and general lateral relationships between measured sections for each drainage. Sections were correlated based on field relationships and facies trends. Table 18 is the legend for the schematic profiles and all of the measured sections.

Discussion

Discovery Creek

Discovery Creek is characterized by three types of sedimentation, glaciofluvial channels (DIS 2-9), gulch gravels (DIS 1-1, DIS 1-2 and DIS 1-3), and periglacial alluvial fans (LDIS 1-1). At elevations of 4200 feet ASL and above, the glaciofluvial channel cuts bedrock in a paleoflow direction perpendicular

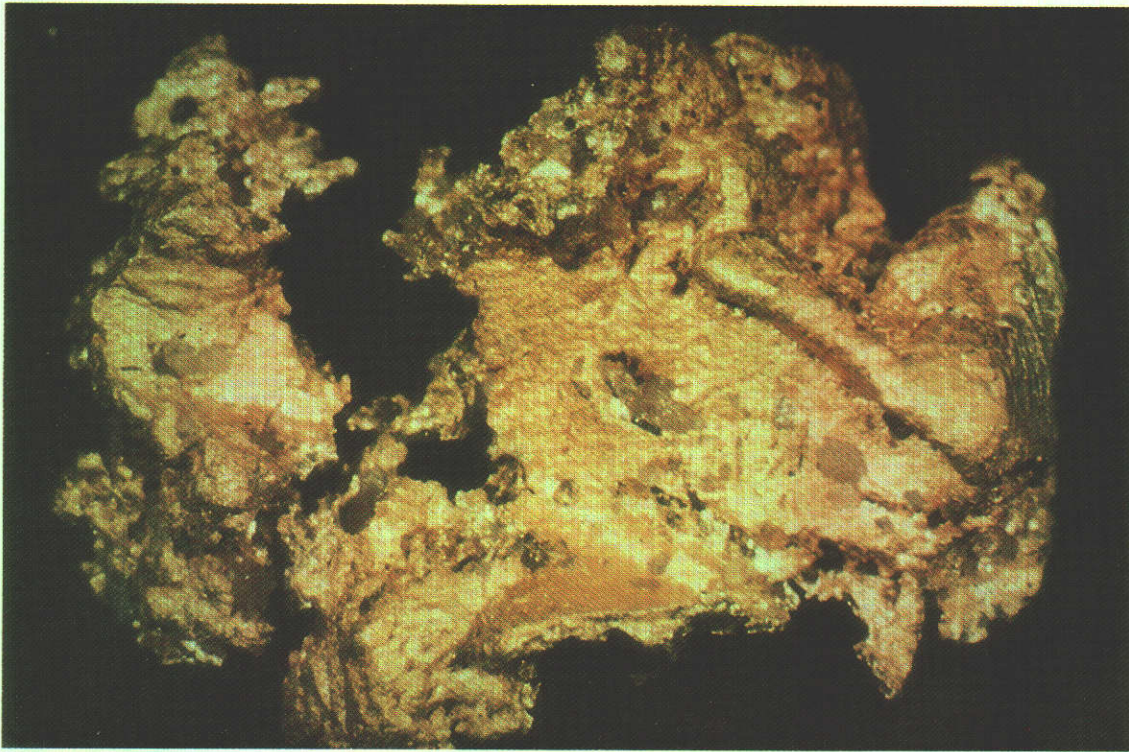


Figure 64 - Angular gold grain from alluvial fan gravels on Klaza River. Field of view approximately 1 cm.



Figure 65 - Gold specimen from Back Creek with attached quartz. Field of view 1 cm.



Figure 66 - An assortment of shapes are found in gold from the main valley of Nansen Creek. The silver grain in the upper left hand corner is bismuthinite. Field of view 3 cm.



Figure 67 - Striations on a flat gold specimen from Klaza River. Field of view 5 mm.