Johnny's Creek No. 1 550'- 600'

(Loose sand and chips)

The sample was divided into a "chip" and a "sand" sample, and a selection of chips were impregnated with plastic and the aggregate was thin sectioned. The sand was placed in immersion oil and examined by transmitted light, and was also examined in incident light with a binocular microscope.

The chips can be grouped into three categories: siltstone, in which the average grain size is less than 0.05 mm.; medium to coarse sandstone in which the average grain size exceeds 0.1 mm.; and oolitic chert. The siltstone is most abundant and the chert least abundant in the assemblages sectioned, but it is not certain that these proportions correctly represent the whole sample.

The siltstone is composed mainly of angular quartz grains, microcline, and muscovite. Tourmaline is a common accessory, with occasional rounded grains of zircon. In many fragments there is a small amount of clay matrix, and in a few the matrix is predominant and richly pigmented with iron oxide.

The sandstone consists of well rounded to nearly spherical quartz grains with a small amount of angular silt sized quartz, microcline, and albite, and accessory zircon and tourmaline. The tourmaline may occur as sand sized spherical grains which are quite conspicuous though not abundant. There is considerable variation in matrix and cementation. In some fragments the original porosity is filled by interlocking quartz overgrowths on spherical quartz grains. In others, originally spherical or subspherical quartz grains have been welded together by compaction into a tight quartz mosaic. In a few, there is an appreciable matrix of clay, iron oxide, and silt sized quartz and feldspar. Some consist of rather sparsely disseminated grains in a carbonate matrix which is unaffected by acid and must be dolomite.

The oolitic chert fragments consist of cryptocrystalline oolites with a vaguely defined concentric structure, surrounded by radial aggregates of fine quartz crystals which coalesce into a fine quartz mosaic in areas interstitial to the oolites. The oolites average about 0.2 mm. in diameter. There are a few well rounded quartz grains 0.1 - 0.3 mm. in diameter scattered among the oolites. Some of these are also surrounded by radial overgrowths of fine quartz. Some oolites are outlined by coatings of hematite. In plain light the chert is pale tan in color in contrast to the colorless quartz grains. It appears almost structureless, the oolites being conspicuous only in polarized light.

Johnny's Creek No. 1 550-600' (cont)

An association between the chert and the calcareous sandstone is suggested by one fragment which contains both an oolite composed of radial cryptocrystalline quartz, and rounded quartz grains imbedded in dolomite. Where the oolite is in contact with a quartz grain the two have become firmly welded by recrystallization of radial quartz which is optically continuous with that in the quartz grain.

The sand sample is composed mainly of spherical and subspherical quartz grains 0.8-1.0 mm. in diameter, and rounded fragments of siltstone of similar size. There are a few ferruginous granules. There are a few well formed quartz crystal aggregates such as might form in a vug 1.0-2.0mm. in diameter.

Conclusions

The chert oolites are unusual, especially as there is some evidence that they are primary rather than replacements of calcareous oolites. They coalesce to form chert nodules apparently associated with calcareous zones in the sandstone.

The coarsest and most highly spherical quartz grains are associated with sandstone chips containing a carbonate (dolomite) matrix. It may be inferred from this that the coarse, loose sand is derived from zones from which carbonate cement has been removed in solution. It is probable that most of the carbonate was calcite, and that now only the relatively insoluble dolomite and silica cemented aggregates remain.

W. B. Bryan
April 14, 1965