MIDDLE JEQUITINHONHA ALLUVIAL DIAMONDS.

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The Middle Jequitinhonha Alluvial Diamond deposits are hosted by gravels within the Jequitinhonha Valley between the towns of Peixe Cru and Itira in Northern Minas Gerais in Brazil. The gravels occur within the present river, it's floodplains and in palaeo-terraces which are situated 40, 80 and 280 meters above the average water level of the present river. Remnants of the palaeo-terraces, which are characterized by quasi-horizontal topographic features underlain by gravels often, but not invariably, composed of reddened (soil-iron stained) pebbles and cobbles, supported by a sand matrix, which may or may not be overlain by grey floodplain silt. The present Jequitinhonha River is situated at 320 meters above sea level in the central part of the Middle Jequitinhonha Valley near Porto Mandacaru. The Jequitinhonha River has a gradient of 1:138 in the upper reaches of the Middle Jequitinhonha Valley near Peixe Cru and a gradient of 1:420 in the lower reaches around Itira.

Diamonds are known to occur within the present river gravels, the silt-covered floodplain gravels (generically named the "low terraces") and the 40 meter terrace gravels but no testing has been carried out to date on the 80 and 280 meter terrace gravels. The present river gravels are characterized by the presence of relatively well to poorly sorted coarse-sand matrix-supported highly-rounded quartz cobbles and boulders varying in size up to 20 centimeters across. Rare quartzite (Espinhaço) and carbonaceous quartzite cobbles and pebbles may be present. The heavy mineral content of the matrix sands are comprised of kyanite (>90%), sillimanite, garnet (pyrope and almandine), ilmenite, rutile, zircon, monazite and gold. The low terrace gravels are essentially similar to the present river gravels in composition and distribution. These terraces, which normally only form small remnants adjacent to the present river in the steep-sided valley sections of the river, may be elevated up to 5 meters with respect to the present river gravels or may lie at the same altitude. The low terraces form extensive flats adjacent to the river in the low-energy stretches of the Middle Jequitinhonha Valley around Itira. The bedrock on which the present river and low terraces flow is normally hard, freshly exposed Macaubas and Salinas Formation garnet-kyanite-sillimanite schists. The bedrock is extremely irregular, forming excellent traps for heavy mineral and diamond accumulations. The 40 meter level terrace gravels tend to have the same cobble-pebble and matrix physical and mineralogical composition as the present river gravels but laterite cappings and intercalations may be present. The bedrock schist on which the 40 meter terrace gravels have been deposited is usually unweathered or only slightly weathered, but highly weathered saprolite bedrock sections have been encountered sporadically. The 80 meter level terrace gravel is characterised by very large, highly-rounded quartz cobbles up to 40 centimeters in diameter supported by a matrix of sand and silt. Present indications

are that there is a grain-size gap in the 0.5-3 millimeter fraction which may possibly have been removed during re-deposition of the gravel from a pre-existing site. The heavy mineral fraction is comprised mainly of staurolite, as opposed to kyanite in the lower terrace gravels. This fact may be related to the grain-size gap. The 280 meter terrace has a high percentage of highly-rounded, small, quartz pebbles. Present indications are that there is no grain-size gap and the gravels appear to be largely in-situ. The heavy mineral fraction is comprised mainly of kyanite, garnet, ilmenite and rutile. This terrace can be traced over a wide area in the Middle Jequitinhonha Valley where the Jequitinhonha River apparently meandered in wide, sinuous arcs about 1 million years ago. The widespread preservation of this terrace level is related to the extensive, resistant, quasi-horizontal Limoeiro Pegmatite sills which occur in the central parts of the Middle Jequitinhonha Valley between Buriti and Barra de Salinas. The sills (500 meters above sea level) are more resistant than the enclosing schists and have slowed down hillslope retreat at the cliff-forming outcrops, thus resulting in the preservation of the old river course.

The spectacular preservation of the abovementioned palaeo-terraces at distinct levels in the Middle Jequitinhonha Valley can be explained by sudden breaching of N-S trending resistant barriers that crossed the Jequitinhonha River, past and present. A present example is the resistant N-S striking pegmatite and quartzite barriers that cross the Jequitinhonha River at Barra de Salinas where the river suddenly changes course in a northerly direction as it encounters the pegmatite dyke and then abruptly changes course again southwards, flowing against the quartzite barrier until resuming it's ENE course 2 kilometers later where it breaches a fracture in the quartzites. The ENE course of the present Jequitinhonha River in the upper parts of the Middle Jequitinhonha Valley is controlled by a joint set. Deep straight-sided gravel-filled canals result from the action of the river on the joints. On the other hand the ESE course of the river, downstream from Coronel Murta, is controlled by a different joint set related to the granite intrusions in that area.

The principle minerals of economic importance in the Middle Jequitinhonha Valley gravels are diamonds, gold, sillimanite, kyanite, ilmenite, rutile and monazite. The diamonds, which are mainly of gem quality, tend to occur mainly in the form of rhombdodecahedra and tend to have a brown to green surface colouration, possibly owing to radiation, which disappears on polishing. The origin of the diamonds is widely considered to be the Sopa Conglomerates which occur in the Grão Mogol area. The gold in the gravels is derived from widespread occurrences of this mineral in the ductile to ductile-brittle shear zones in the area that formed during thrusting (Brasiliano age) against the São Francisco Craton. The sillimanite and kyanite are derived from the schists formed during medium-low pressure metamorphism accompanying the Brasiliano tectono-thermalism in the area. The rutile and monazite are derived from Brasiliano anatectite granites and related hydrothermal action in the host-rocks of the Middle Jequitinhonha Valley.

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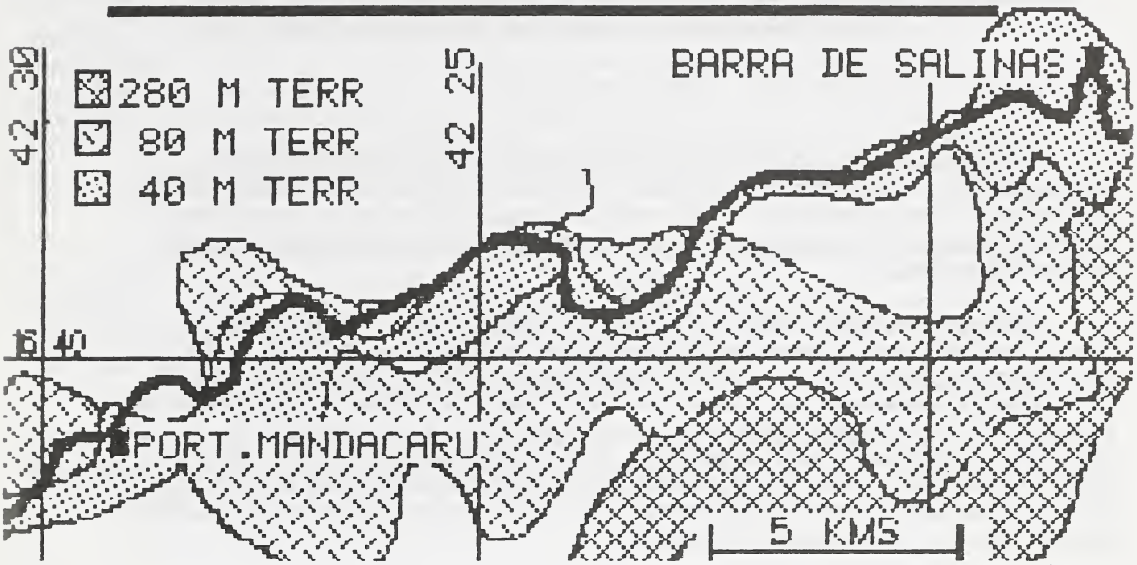

TYPICAL SECTION ACROSS THE MIDDLE JEQUITINHONHA VALLEY