milling action also releases valuable minerals from their enclosing rock. In almost all cases, these valuable minerals are dispersed or only slightly concentrated but, given a rare combination of favourable erosional and current conditions, and because of the relatively high density and physical and chemical stability of some valuable minerals, they may lag behind their lighter fellows of equal size and become concentrated as placer deposits of commercial value. Gold has been recovered in modest quantities from the beach sands of Cunard Cove, Nova Scotia, and is still being freed from the nearby cliffs. More commonly, placer deposits result from the erosion of inland areas and subsequent river transport. The famous gold placer deposits of the Yukon were formed in river channels more than 1,000,000 years ago, at a time when mastodons and sabre-toothed tigers roamed the area. In Nova Scotia, at Gay's River, gold was similarly but less efficiently concentrated in coarse gravels about 350,000,000 years ago, at a time when giant reptiles were the dominant form of life on earth. These gravels were subsequently covered by thousands of feet of sands and muds, washed from the newly formed Appalachian Mountains.

The probable history of the vast uranium deposits of Elliot Lake, Ontario, even though it began more than 1,600,000,000 years ago, has been deciphered by geologists. Geological studies on the surface, underground and in the laboratory indicate that a granitic land mass of modest relief lay to the north of the present Elliot Lake district. Over an extended stable period, these rocks were deeply weathered and all but the most chemically inert minerals such as quartz were broken down to clay and disintegrated materials. At the beginning of Aphebian time, uplift or tilting of this weathered land occurred and mechanical, rather than chemical, erosion became dominant. Rivers swept the rotted upper layers of decomposed rock to the southeast. Quartz pebbles moved along and became rounded in the river channels and, because they were the largest remaining materials, formed blankets of gravel, and filled channels as the gradient and current of the rivers decreased. At the same localities, fine-grained sands and clays continued to be swept seaward. However, even small grains of abnormally heavy minerals such as uraninite, zircon and monazite, which had also resisted earlier chemical decomposition, could not be carried so readily by the waning currents and came to rest in the spaces between the rounded pebbles of quartz. Following this first flushing of the deeply weathered land mass, erosion and transport continued and many thousands of feet of Huronian sediments buried the uranium-rich quartz gravels. Subsequent lithification, folding, mineralogical changes, and further intervals of erosion during 1,500,000,000 years produced folded, uraniferous quartz conglomerates which lie below and locally intersect the present earth surface. These exposed rocks were used to prepare the geological map of the district published by the Geological Survey of Canada in 1925. In 1952, after the uranium content of these conglomerates had been deduced by exploration geologists, this geological map proved invaluable because it outlined the sinuous distribution of the potential ore-bearing formations and accelerated the development of this large mining camp.

The above examples outline only one set of many dynamic geological processes. Geological maps and knowledge of such things as ancient geography, direction of flow of ancient rivers, and the character and degree of weathering of ancient land masses should be known if intelligent evaluation is to be made of the long-range mineral potential of the nation for undiscovered placer deposits of the above types. Apart from uranium, most mineral production comes from a wide variety of other types of deposit. Some, such as asbestos, are formed by alteration of particular rocks of high iron and magnesium content. In other cases, under favourable conditions, major parts of the rock itself can be mined or quarried. Examples include limestone, nepheline syenite, rock salt, gypsum and potash. Space does not permit an attempt here to point out the interrelation of mineral deposits to their geological setting and, in many cases, much remains to be learned about the origin of many types of base and precious metal ores. However, ore deposits are not randomly distributed 'freaks', but comprise rare concentrations of materials formed under particularly favourable geological conditions during the building of the Continent. Efficient exploration by mining companies and evaluation of the mineral potential of the nation depend on geological information and knowledge, augmented by geophysical and geochemical tech-