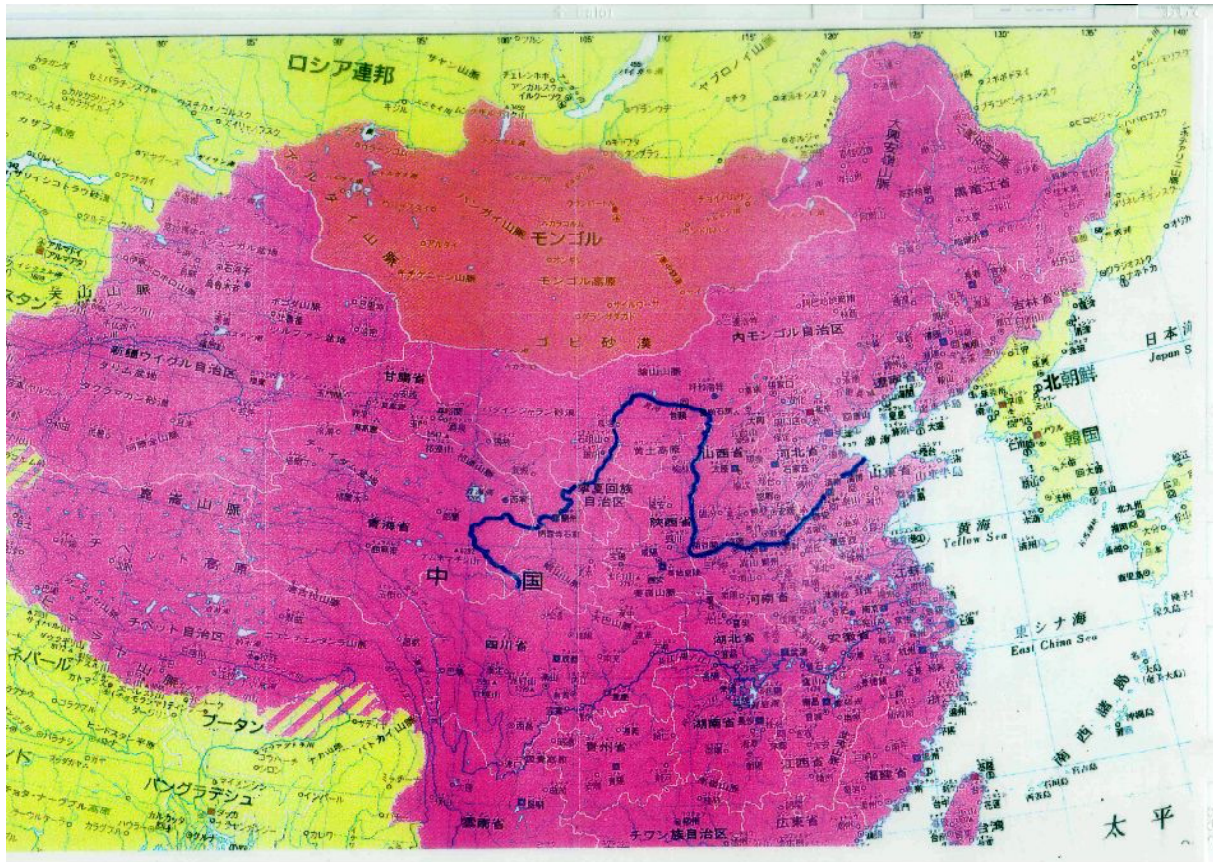


# History of Concrete

- BC7000:Galilee in Israel, it is consist of several layer of  $\text{CaCO}_3$  (upper finish of 5mm and core 50mm), which was apparently manufactured by burning of lime stone and slaking thereafter. The structure is quite dense and the strength exceeded 30 Mpa.
- BC5600:Danube river in Yugoslavia.

- BC3000: Daichiwan (大地湾) in China, between 西安-蘭州 from this area 秦 (the first empire of China) was born.
- Where is the region? (map)
- We (I and Prof.Daimon,etc) visited the area and confirmed the facts.
- The cement was incidentally produced from lime stones while china wares (earthenwares) were burned in furnaces about 900°C.
- China wears are still produced in the area.
- Also we found the used materials (lime stones). They are called “Ryokyoseki”.

# Where





China Wears are still produced in the area.



The lime stones



The place where we can get lime stones.

This cementitious material is very similar to B-lite (belite) cement which is known as low-heat type cement.

The people used the cementitious materials as the top coat of the floor in the form of mortar.

You can see from the picture, the floor is in a good condition even 5000years have passed.

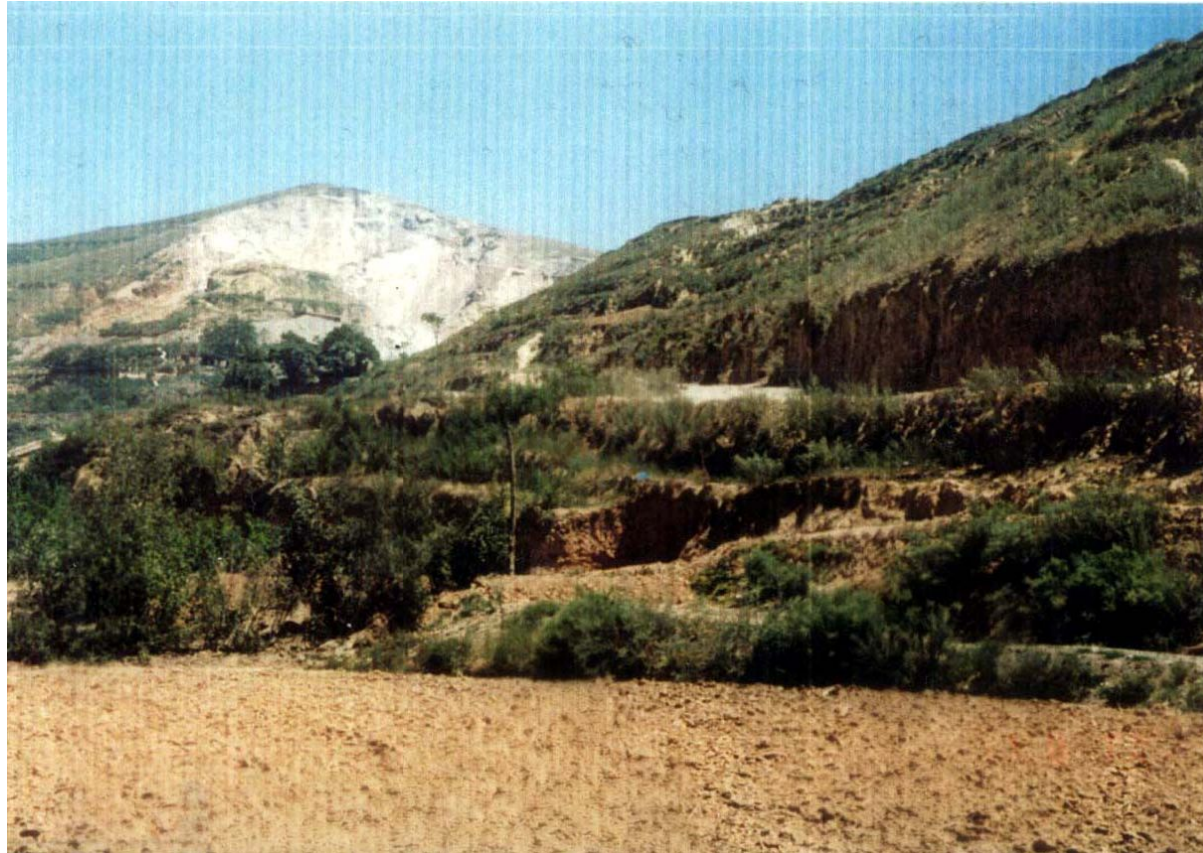


The floor (10x20m)





The museum



The landscape around and this area said to be a great forest.

- The Romans, during the period between BC300 and AD200, they used slaked lime in a mixture with volcanic ash (called pozzolana) found in near Pozzuoli near Naples Bay.
- The Romans also developed the concept of light weight concrete by casting jars into wall arches as well as the use of pumice aggregates. The arches of the Colosseum and the Pantheon dome were made with such materials.

- 1824: Evolution of Modern Portland Cement

A three stage process for producing hydraulic cement was first developed by Joseph Aspdin: 1. Calcining limestone, 2. burning it with clay, 3. recalcining the mixture to obtain the final product.

- 1984: A reinforcing system was patented by E.L.Ransom.
- 1927: E.Fressynet developed the pre-stressing concept.