CHAPTER 2

GEOLOGY AND PETROGRPHIC STUDY

2.1 Geology of the Investigated Area

Geology of the investigated area (Fig 2.1) is simply composed of ultramafic rocks and country sedimentary rocks. Most of the outcrop exposed are concentrated in the central and southeastern parts of the area. Quaternary deposits cover area for the rest. The ultramafic rocks distribute fairly well in the central part of study area. The exposed ultramafic zone extends for 3 kilometres in the NW-SE direction and locally attains a width of 1-1.5 kilometres. Some ultramafic exposures have been found to be a smaller disconnected mass further to southeast of the area. The main rock type of these ultramafic rocks is serpentinite, whilst pyroxenite is subsidiary (Salyapongse, 1983). The sedimentary rocks consist of chert, sandstone, tuffaceous sandstone and fossiliferous limestone. The age is ranging from lower to upper Permian (Salyapongse, 1983). Fossils in light grey to grey limestone are fusulinids and brachiopods. The limestone in the area is exposed scatterly through the area. The rocks of chert, sandstone, tuffaceous sandstone, and tuff are trending parallel to the ultramafic zone in NW-SE direction. Conglomerate with fusulinid bearing limestone pebbles is indicated to be the Triassic rock (Salyapongse, 1983). The rock consists of pebbles and cobbles of chert, limestone, slaty shale,andesite and serpentinite. There is only a small area of rhyolite exposed in the central west. On the north and southwestern portions of the area studied, Quaternary deposits are predominant and

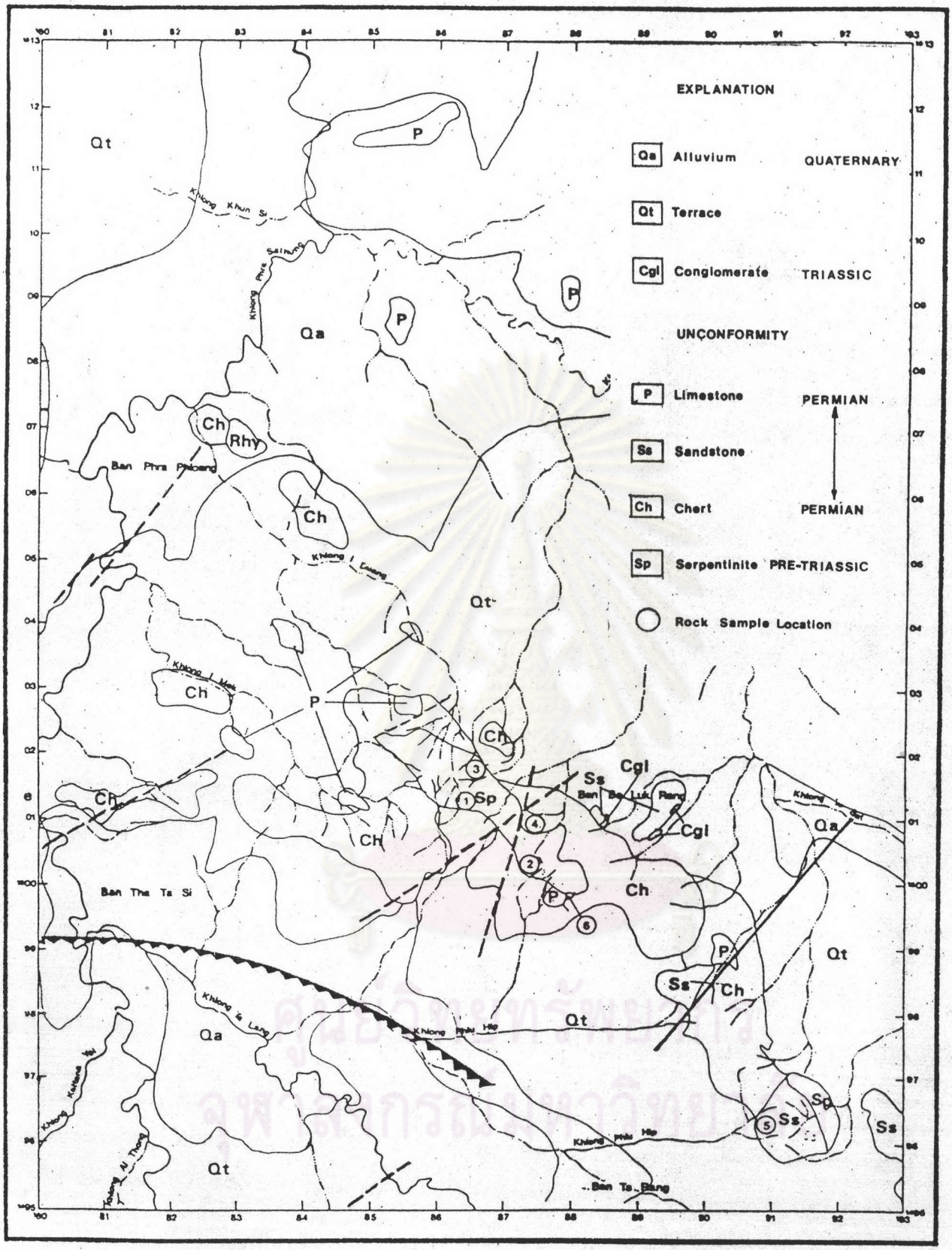

Fig 2.1 Geological map of investigated area, Amphoe Wang Nam Yen, Changwat Prachin Buri.

consist of alluvium, terrace deposit and laterite. Alluvium is composed of gravel, sand, silt, clay, and mud of flood plain. Terrace deposits are mostly consist of gravel, sand, and silt. Most of the laterite in the area are generally mottled red and reddish brown, vesicular and pisolitic. Simplified stratigraphic relation of the rock units is presented in Fig. 2.2

2.2 Petrographic Study

2.2.1 Ultramafic rocks (Fig. 2.3 to Fig 2.9)

Samples from three localities of ultramafic rocks were collected from location 1, 2, and 3 (Fig 2.1). Megascopic study of ultramafic rocks shows that the rock are pale green to very dark greenish grey aggregate of predominant serpentine and minor amount of other mineral constituents. Most of the rocks are massive and compact. The principal ultramafic rock type is serpentinite whereas subordinate is pyroxenite. Under microscope, the rocks consist almost totally of serpentine. Mesh and bastite relict texture of olivine and orthopyroxene pseudomorphed by serpentine, are observed in every thin section. Relict olivine is far more abundant than relict orthopyroxene. Round and idiomorphic crystals of chromite and some ilmenite scatterly distribute throughout the rock. Chromite grain is frequently replaced by ilmenite along its borders and fractures whcih again is coated by hematite. Minute magnetite cube which is partially pseudomorphed by hematite is very common. Exsolution ilmenite-hematite skeleton is obvious.

2.2.2 Chert (Fig. 2.10 and 2.11)

Megascopically, chert is commonly pink to pinkish grey on fresh surface and coated with brown to brownish black color on fractured

surface. The rock is composed mainly of very fine-grained siliceous sediments. Some thin bedded chert is also found in the study area. Microscopically, the chert consists mainly of cryptocrystalline quartz. Surfaces along cracks and fractures are stained with iron oxide.

2.2.3 Sandstone (Fig. 2.12 and 2.13)

Sandstone in the study area is defined as quartz-wacke. Megascopically, weathered massive sandstone shows mainly quartz grains, subangular to subrounded and poor sorting. The porosity is high and some pore are spaces filled with iron oxide. The color varies from pale yellowish brown to reddish brown. Under microscope, the rock consists chiefly of quartz and cryptocrystalline quartz. The subangular to subrounded grains of sand lie in the ferrogenous matrix. Altered feldspar and rock fragments,such as rhyolite, chert, and argillite, are also found. Clusters of iron oxide are commonly present.

2.2.4 Tuff (Fig. 2.14 and 2.15)

This rock is found to be associated with serpentinized rocks. It is commonly greensish grey to dark grey with subsidiary of purplish grey. Microscopically, the rock can be differentiated into two portions, vitric and crystal tuff. The crystal tuff consists mainly of broken crystals of plagioclase and probably a few biotite with a small amount of various kinds of rock fragments embedded in a matrix of glass dust. The crystals are largely altered to calcite, chlorite, siderite and epidote. The vitric tuff comprises a few plagioclase crystals in a glass dust matrix. It is highly vesicular. Chloritic material is found filling up vesicles and, especially around rock fragments.

Fig. 2.2 Simplified stratigraphic relation of rock units in the area studied, Amphoe Wang Nam Yen, Changwat Prachin Buri.

Symbol	Lithology	Age
Qa	Alluvium	QUATERNARY
Qt	Terrace and Colluvium	
Cgl	Conglomerate with fusulinid bearing limestone pebbles	TRIASSIC
	UNCONFORMITY	
P	Limestone, fossiliferous	U PERMIAN
Ss	Sandstone, pale brown to reddish brown, tuffaceous ss	
Ch	Chert, pink to pinkish grey	
Sp	Serpentinite, greenish grey, dark green.	PRE-TRIASSIC

A

B

Fig. 2.3 General texture of serpentinite (A) and showing sheared surface (B), Amphoe Wang Nam Yen, Changwat Prachin Buri.

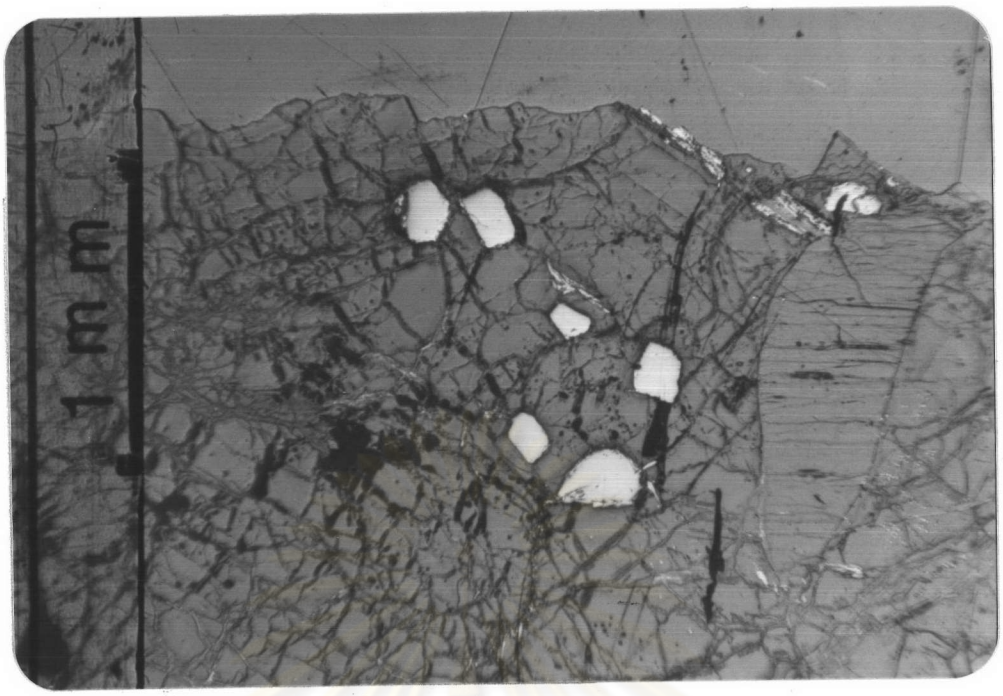

Fig. 2.4 Photomicrograph of polished section of serpentinite from location 1, showing chromite grains, Amphoe Wang Nam Yen, Changwat Prachin Buri.

Fig. 2.5 Photomicrograph of serpentinite with hypersthene lying in the matrix of mesh texture serpentine (Sample from location 1, X-nicols, x 10).

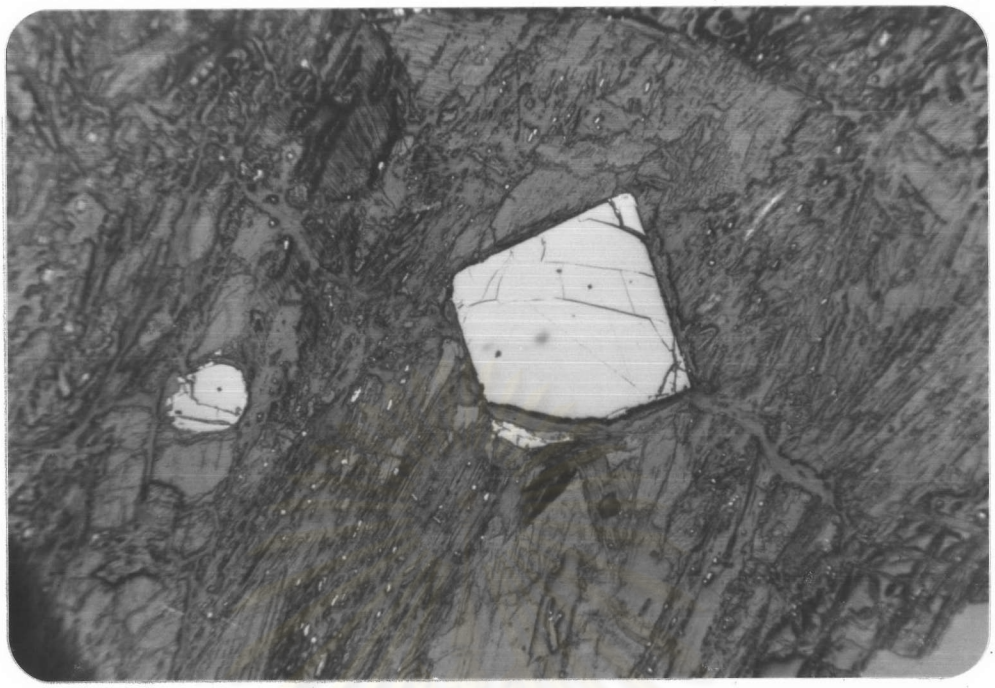

Fig. 2.6 Photomicrograph of polished section of serpentinite from location 2. Chromite grains presented in a matrix of serpentine. (x 25)

Fig. 2.7 Photomicrograph of serpentinite, showing the veinlets are completely filled up with fibrous serpentine. (Sample from location 2, X-nicols, x 10).

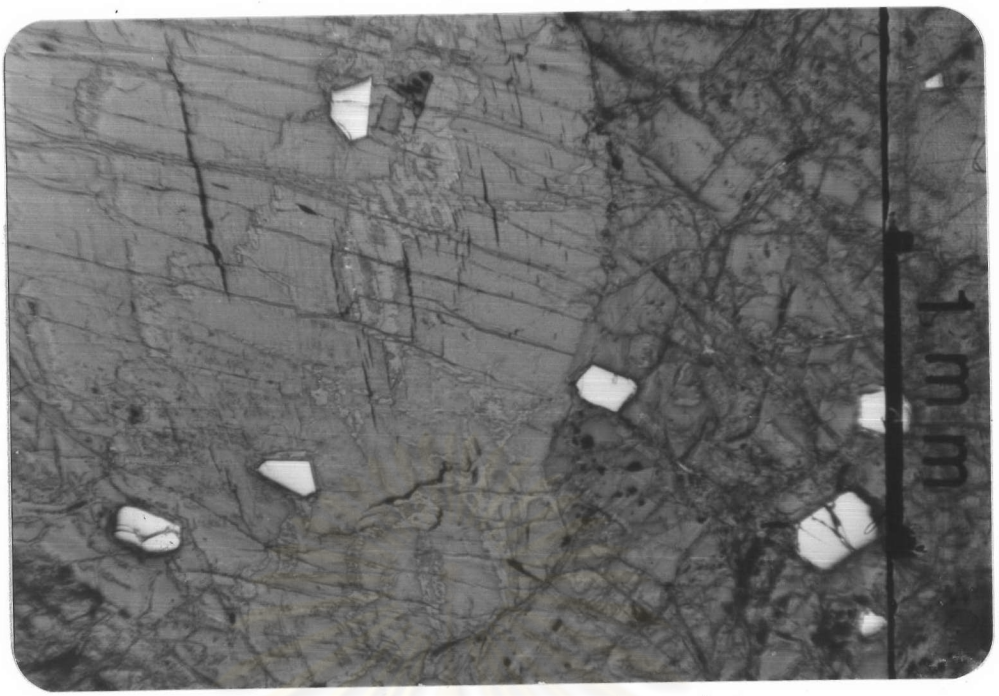

Fig. 2.8 Photomicrograph of polished section of serpentinite from location 3. Chromite grains scattered through the serpentinized rocks.

Fig. 2.9 Photomicrograph of serpentinite, showing hypersthene in the matrix of serpentine (Sample from location 3, X-nicols, x 10)

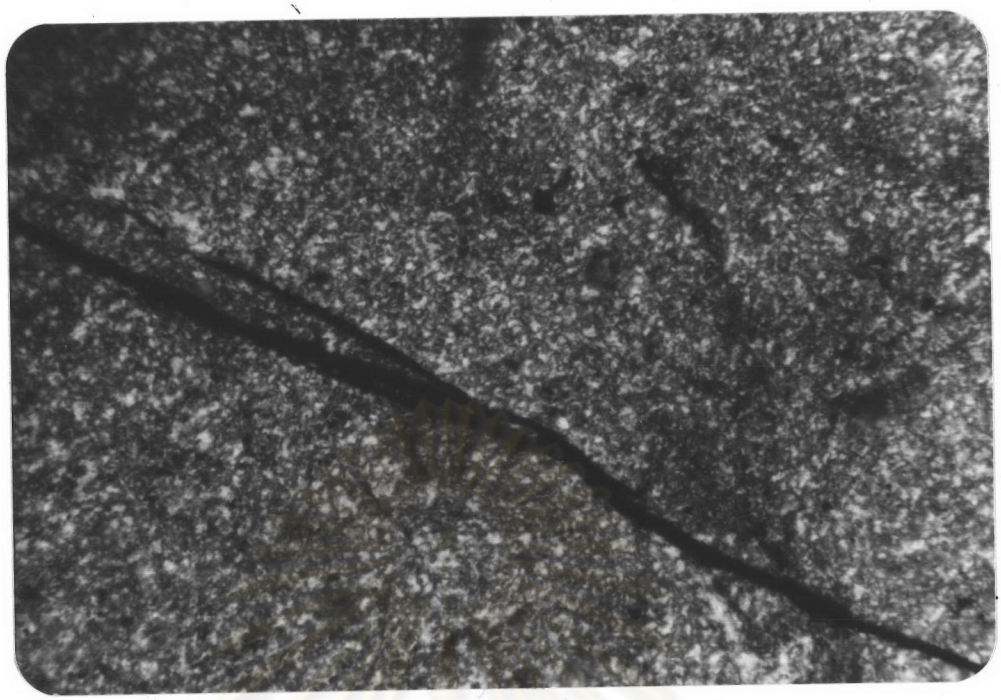

Fig. 2.10 Photomicrograph of chert, cryptocrystalline quartz is partially stained by iron oxides which fill up the fracture (Sample from location 4, X-nicol, x 25).

Fig. 2.11 Photomicrograph of chert, crypto-micro crystalline quartz in sharp-walled veinlets and fractures of breccias (Sample from location 4, X-nicol, x 25).

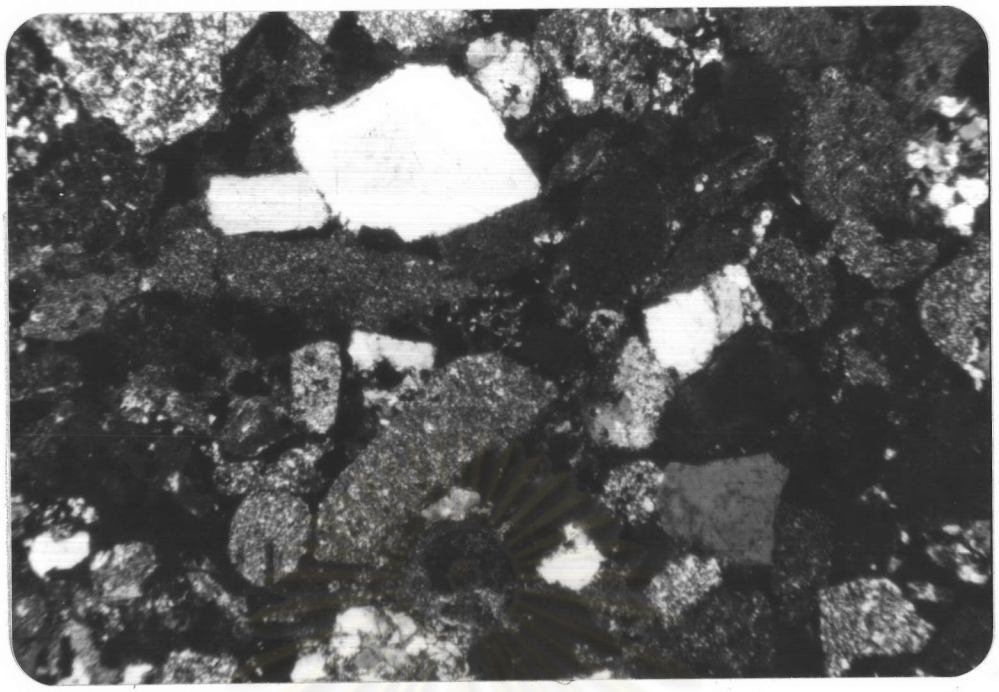

Fig. 2.12 Photomicrograph of sandstone, fragments of quartz, feldspar, chert, argillite are predominant in quartz wacke (Sample from location 5, X-nicol, x 10).

Fig. 2.13 Photomicrograph of sandstone, poor sorted of subangular grains are embedded in the argillaceous and ferrugenous matrix and cement (Sample from location 5, x 10).

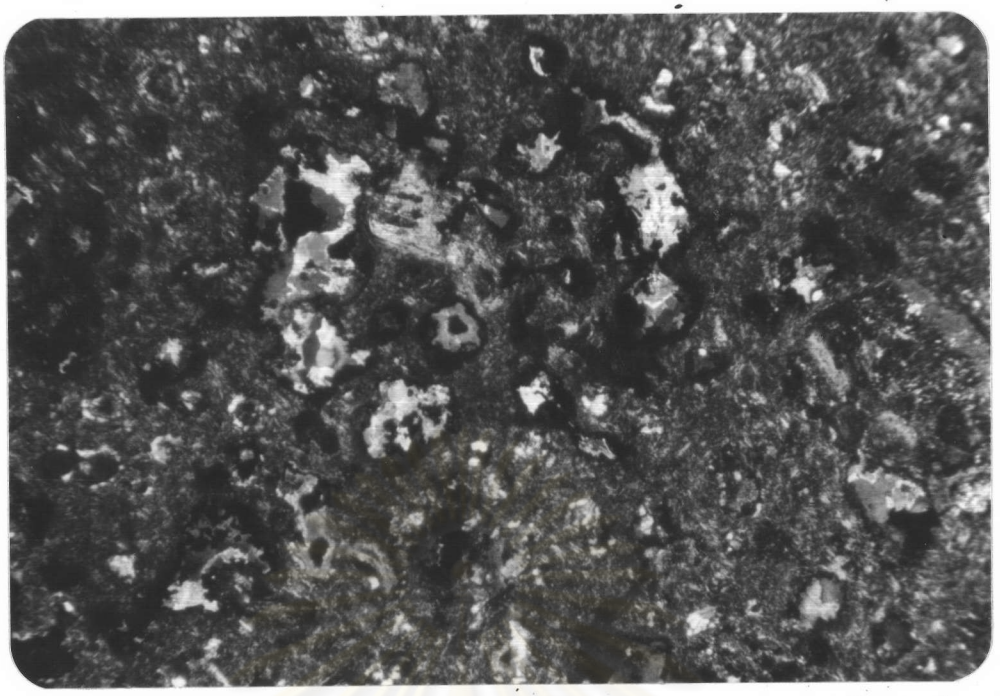

Fig. 2.14 Photomicrograph of crystal tuff, broken crystals plagioclase and volcanic rock fragments are lying in the matrix (Sample from location 6, X-nicols, x 10).

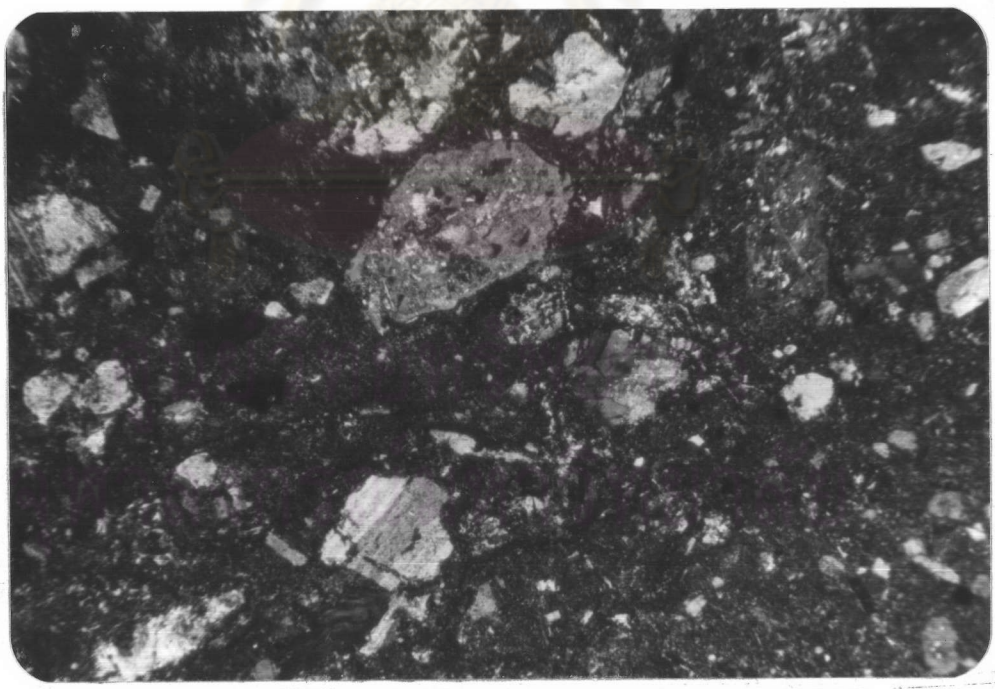

Fig. 2.15 Photomicrograph of vesicular vitric tuff, located nearby the crystal tuff, consist mainly of refilled vesicles in the matrix of volcanic glass (Sample from location 6, X-nicols, x 10).