CHAPTER V

STURCTURAL GEOLOGY

Geologic structure in the area is rather simple and it is considered to have been caused and modified principally by the major regional tectonic event developed since late Paleozoic and locally by the younger plutonic activities. In general fold axes and attitudes of the Permo-Carboniferous sedimentary rocks of the Phuket Group trend from N-S to NNE-SSW directions with low angle dips which conform with the the general regional tectonic pattern in this area described by Garson and others (1975). However, there are local variations in the attitudes of these stratified rocks locating close to the fault zones as well as along the margins of the igneous bodies. The Phuket sedimentary rocks, structurally, have been folded into series of small anticlines and syncline. The most important folded structure in the sediments, as referred from Hummel & Phawandon (1967) and also from the present field observation is at Laem Pappa, south of Ko Sire. It forms a small syncline and anticline with the fold axes plunging 10°S. The width of the the fold axes are about half kilometer apart. The more or less N-S trending trending anticlines are also recognized at the Kathu Area (Khao Bang Nieo Dam), locating near the fault contact, and at Tor Soong Mine. Moreover in a few places, numerous lesser order structures including minor folds, crenulations and lineations are associated with these folds.

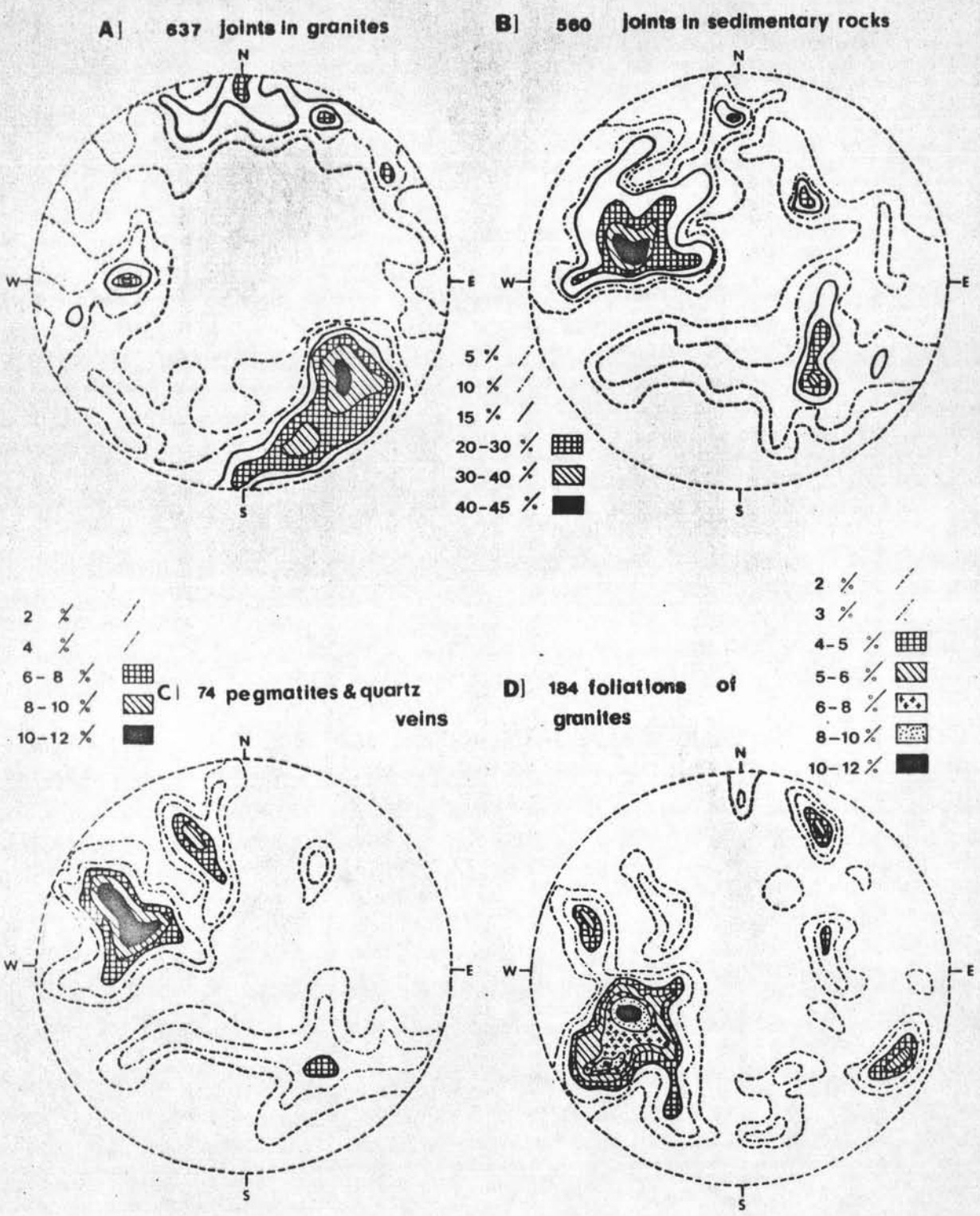

FIGURE 4. ¶ diagrams of 637 joints in granites (A), 560 joints in sedimentary rocks (B), 74 pegmatites & quartz veins (C), and 184 foliations (D).

Generally, beddings of the sedimentary rocks of the Phuket Group are well defined both by lamination and by bedding traces visible on aerial photographs. The dippings are frequently lower in the eastern part of the area than in the central part.

The primary foliation in the granitic rocks, especially G-1, is marked by the moderate parallelism of the tabular potash feldspar phenocryst (Photograph 3) and in occasionally of mica flakes and lenticular inclusions. The foliation appears commonly in the coarser--grained granites and rather rare in the finer-grained varieties (Map 3). Secondary foliation in the granites may be found only along the localized sheared zones within the plutons. The foliation of the Phuket Plutons orientates predominantly along the NNW-SSE direction as shown in the stereonet diagram (Figure 4 D).

Data of the joint system in the area belonging to the Phuket Plutons and the Phuket Group have been plotted in the stereonet as shown in Figure 4 A and 4 B, respectively. It is clearly shown that the joint pattern in the granite develops prevailingly in the NE-SW direction with steep dippings. Whereas the joint pattern in the sedimentary rocks show preponderantly in the NNE-SSW direction with moderate dippings. Less developed joint, NW-SE, is also found in the plutonic and the sedimentary rocks.

Variable sizes of dikes as well as veins of quartz, pegmatite and aplite follow concurrently with the major NNE-SSW and the minor NW-SE directions of joints, particularly those of the sedimentary rocks. Comparing data on figure 4A, 4B and 4C, it is undoubtedly indicated

that these dikes and veins have been emplaced into the joint system of the overlying sedimentary strata during the late magmatic process. Both joints and minor intrusives are mostly steeply dipping. It is important to note that tin-barren veins and dikes occupy both in major NNE-SSW and minor NW-SE joints while tin-bearing ones occupy mainly in the NNE-SSW direction. At Tor Soong Mine and northwest of Head Patong, the NW-SE pegmatites were cut by NNE-SSW pegmatites. This might be suggested that the tin-barren pegmatites, probably from late magmatic products of the G-1 and G-2 granites, had intruded primarily along the NNE-SSW and NW-SE joints. Subsequently, the tin-rich pegmatites, perhaps derived from late magmatic solutions of the G-3 and G-4 granites, intruded principally in the NNE-SSW joints.

There are one major fault and two minor ones recognized in the area as shown in the structural map (Map 3). Shear faults were recorded mainly from the displacement of igneous rocks, especially dykes and veins. Faults in the granitic bodies are more common than those in the stratified rocks. The only one major fault is located at the valley between Khao Chetra and Khao Bang Nieo Dam and extends southwesterly to eastern part of Khao Kwan Wa and some parts of Khao Mai Tao Sip Song. This fault has been traced partially in the field and subsequently from aerialphotographic interpretation to have at least 7-8 km long. This fault is served as the sediment/G-1 granite contact. Field observations reveal noteworthy features of this fault, included are the sharp contact, slickensiding, cataclastic texture, and brecciation. Those criteria, perphaps, would suggest that the fault took place after the G-1 granites have consolidated

totally or at least partially. The two miror faults are located at Kathu Valley and Khao To Sae (eastern slope). The first one occurs in sedimentary rocks and is characterized by brecciation of the host rock and development of numerous small quartz and pegmatite veins within or parallel to the linear zone. The second one is found in the granite (G-4 type) as evidently shown by the displacement of quartz vein and fainted secondary foliation of mica flake. These two minor faults can be traced in distance at least 10 m. The second minor fault trends in NNW-SSE direction whereas the first minor and major fault lie in NE-SW to NNE-SSW directions.

According to Garson and Mitchell (1970) and Garson and others (1975), the main episode of folding in this area probably took place in late Triassic times which affected sedimentary rocks of the Phuket Group to be folded and cleaved. They also suggested that the displacement of large-scale NNE-SSW to NE-SW transform faults, e.g. Klong Marui, Ranong, Bang Kram and Phangnga Faults, took place in late Jurassic to Cretaceous. These faults probably control the similar trending of major fractures, veins and dikes of the late fractionated granitic solution. However, distributions, though in less abundant, of the tin-barren and tin-bearing veins and dikes in the late Cretaceous to Tertiary G-3, G-4 and G-5 granites are also aligned in the same trend, as those affected by the large transform faults. These veins and dikes are thought to be the same as elsewhere, and their distribution, by the same reason, might be controlled by the effect of the large-scale faults. If this is the case, the duration of activity of these large scale faults might extend even longer to the Tertiary.