penetrative magmatic fabrics (Figure):
— those wiht axial symmetry (type A) result from coaxial deformation (flattening) with shortenings locally exceeding 75%;

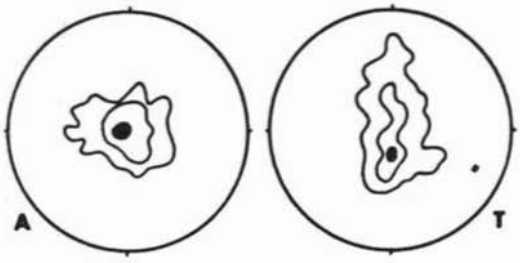

Fig. 1. — The two main types of penetrative magmatic fabrics in the Ile-Rousse Pluton (equal area projection of 120 poles to (010) plane of K-feldspar megacrysts).

— those with monoclinic symmetry (type T: «triton-shaped» fabrics) develop where primitive axial fabrics are deformed by simple shear ($\gamma \simeq 4.5$).

Following the conclusions of petrological and structural studies, a model of emplacement and structuration of the Ile-Rousse Pluton is proposed and extended to the other intrusions of Northwestern Corsica.

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Laporte D.*, Orsini J.B.*, Fernandez A.** - *Petrological study of the Ile-Rousse Pluton, Northwestern Corsica: contribution to a better knownledge of the corso-sardinian batholith*

Within the corso-sardinian batholith, two well-contrasted association of hercynian granitoids are distinguished (Orsini, 1980):
— the volumetrically dominant calcalkaline association
— the magnesiopotassic association.

The second one is composed of K-rich, Fe- and Ca-poor granitoids, abundant in Northwestern Corsica.

The Ile-Rousse Pluton differs by its complexity from the other intrusions of Northwestern Corsica. Indeed, it is made up of several kinds of granitoids which are regrouped in two main petrogenetic types:
— the magnesiopotassic granitoids have deep crustal sources (about 40 km) and are associated with vaugneritic magmas of mantellic or infracrustal origin;
— other granitoids — such as the Corbara granodiorites — are derived from the melting at intermediate crustal levels (about 20 km) of metasedimentary source (S-type granitoids).

Our petrographical, mineralogical and geochemical data concerning the former group reveal the variety of the magnesiopotassic magmatism. This important result can be extended to the whole of Northwestern Corsica: five main groups of magnesiopotassic granitoids are distinguished and differ by their K_2O contents, modal compositions... They would correspond to five genetically independent magmatic sequences.

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Luecke W.* - *Litium in spodumene pegmatites and lithium in Li-muscovite pegmatites (greisen) of the Leinster Granite (SE Ireland)*

Quartz-feldspar-mica pegmatites and aplites as well as unzoned spodumene pegmatites are spatially closely related to the easter contact of the Leinster Granite with Lower Paleozoic metasediments.

The massif, covering an area of approximately 2700 square kms south of Dublin, intruded the crust in Late Silurian to Early Devonian rimes along NE-SW (Caledonian trend) striking zones of structural weakness. The alkali-feldspar rich granite turns out (after Streckeisen) to be a monzogranite-granodiorite; certain marginal regions of the granite, however, have a more tonalitic composition due to a strong depletion in K as consequence of late stage subsolidus alteration.

In such area microcline became corroded and biotite was altered intesively to chlorite, releasing Li, Rb, Cs, F etc. Widespread overburden necessitated boulder mapping, trench sections and drillings by the I.B.M. Ltd. (Dublin) in order to localize the extension of the different Li-pegmatites. Qz-fsp-mus pegmatites and cogenetic Na-aplites (both low in Li) predate spodumene pegmatites which were derived from more developed magmatic residual melts, now rich in Li, Rb, Cs, Be etc. as a result of retrograde boiling with subsequent migration of acqueos fluids (Jahns & Burnham, 1969). Li seems to be the first alkali-trace element available in this sequence and was fixed in spodumene. Muscovite apparently is a some-what later product because of high amount of Rb and Cs, but relatively low Li-contents, though this mineral is generally able to incorporate high Li-concentrations. Greisen-generated Li-muscovite pegmatites grown at the expense of the order spodumene pegmatites may have been supplied additionally with Li, Rb, Cs and F, liberated by the alteration of granite (see above): measured isotopic rations of 6/7 Li of spodumene are different from those of Li-muscovite, thus supporting the idea of a further source for Li besides the magmatic rest-liquids.

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MARIANO G.*, SIAL A.N.* - *Magma mixing: evidence in the Itaporanga batholith, Northeastern Brazil*

Three very coarse potassic-calc-alkalin batholith (Bodocó, Serra da Lagoinha, and Itaporanga) intruded amphibolite facies metamorphics of the basement, adjacent to the northern boundary of the Precambrian Cachoeirinha-Salgueiro Fold Belt, west of Pernambuco and Paraíba states, northeastern Brazil. These bodies were intruded syntectonically to the F_2 deformation with a final diapiric emplacement. In the Itaporanga batholith, with about 200 km^2, the best studied of these bodies, three petrographic facies were mapped. A hybrid zone, characterized by chemical and mechanical mixing, composes most of the outer portion of the batholith, where intense interaction between granite, granodiorite and diorite melts took place, giving rise to migmatite-like features. A commingling facies where granite to granodiorite and diorite units can be well individualized, is located towards the center of the batholith. Finally, areas of porphyritic facies are more abundant in the hybrid zone than in the commingling one.

In the hybrid zone, diorite shows sometimes pillow-like structures evidencing quenching which is confirmed by the presence of finer grain facies and acicular apatite crystals. Cuspate contacts between diorite dikes and porphyritic granodiorites portray the viscosity contrast between these coexisting melts. Obstacles to mixing were overcome very often, judging from the extensive chemical mixing in the hybrid zone. K-feldspar megacryst in the granodiorites often show biotite-rows, evidencing a possibile hiatus in the crystallization due to successive influxes of hotter magmas of dioritic composition.

In this batholith, a well developed foliation dips inwards, attesting to a lower level of exposure of this diapiric complex, justifying the intense degree of interaction between the felsic and mafic magmas.

The granodiorite was dated by a Rb-Sr isochron at 620 ± 22 Ma with an initial Sr ratio of 0.7057 ± 0.0003. Hornblende yielded $^{40}Ar/^{39}Ar$ age spectra with a well defined plateau age of c. 580 Ma, interpreted to date a mylonitic foliation.

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MARTIN F.R.* - *The orthoclase - microcline transition in granites and rhyolites*

All granites and rhyolites contain, by definition, a K-rich feldspar. This common rock-forming mineral typically forms a perthitic integrowth with albite. The granite petrologist is interested in two important variables, which can be measured: 1) chemical composition, and 2) degree of Al-Si order. A third area of variability concerns the microtextural development of the K-feldspar, about which much less in known. Any observations relevant to these properties can contribute to an understanding of the petrology of the suite. A magma, in whose structure the Al and Si atoms show long-range disorder, by definition, will crystallize disordered feldspars. As the granite cools, it contracts, and water typically is set in motion through the network of cracks. One role of water, be it magmatic or derived from outside the igneous body, is to catalyze sluggish reactions at subsolidus temperatures. Whereas initial stages of exsolution and Al-Si ordering, at high subsolidus temperatures, probably proceed by a diffusion-related process, solution and redeposition process seems to take over in the interval between 700 and 600°C.

The specific source of water is very important to the isotope geochemist, as exchange reactions may involve oxygen, rubidium and strontium. The petrologist sees pseudomorphs of the magmatic mineral. He may find a monoclinic K-feldspar (orthoclase or low sanidine), in which the exsolution texture is virtually intact. Such granites typically are high-level, and have cooled too rapidly through the field of stability of microcline (at temperatures below 400°C) for this ordered structure to nucleate.

Instances of magma mixing lead to endothermic reactions that favor presenvation of the disordered feldspar(s). An alkaline fluids will increase the rate of Al-Si ordering, even in nearsurface plutons, because of enhanced solubility of the metastable species of feldspar. Deformation also accelerates the structural conversion. Where cooling has been slower, the inversion may have begin in parts of the pluton in which water circulation was important (e.q., in which the magma was closer to saturation in water). A typical product is a mixture (domain texture) of orthoclase and imperfectly ordered microcline. The exsolution texture typically is distrurbed to a patchy array of domains.

In a deep-level pluton, the K-feldspar may well now consist of fully ordered micrcline, and the exolution texture is highly modified (e.q., shape and orientation of lamellae of albite). The geochemist must ask one fundamental question: since water was involved, has the system remained a closed one, ora has the bulk composition of the feldspar been modified? In most cases, the system seems to have been open, resulting in disturbances in isotopic systems (false K-Ar or Rb-Sr ages, for example) and in the net loss of trace elements like lead, which are linked to the presence of a structural defect. Near-surface granitic complexes that contain low microcline probably have been rehaeted and perhaps more than once; it seems that the assemblage of disordered K-feldspar(s) can «flip» over to ordered microcline without going through the intermediate states if it is brought to a temperature below 400°C and annealed. Products of devitrification in rhyolitic and trachytic systems are *more* susceptible to the subsolidus modifications decribed above in view of their fine grain-size. The rocks that contain the most successfully

equilibrated assemblages of sodic and potassic feldspars (low albite, low microcline) are prone to major changes in their bulk compotision owing to an exchange of Na for K (and *vice versa*). In such rocks, even the elements considered more resistant to moblization (e.q., the rare earths) are likely to have been set in motion at the time the parent feldspar was dissolved. Students of granite petrology need to keep in mind that the alkali-rich feldspars in their rocks are very reactive, are no longer magmatic, and in some cases are likely to be chemically, structurally and texturally much modified. Compositional equilibration involving Na and K, in particular, is particularly, rapid, at least down to a temparature of 200°C. The state of the felspar(s) can provide valuable insight into the postmagmatic stage of evolution of the system. To assume that the ingeous rock still has an igneous mineralogy is a widespread and comfortable point of view, but a highly unrealistic one in the case of granitic and rhyolitic systems.

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MELLINI M.*, TROMMSDORFF V.**, COMPAGNONI R.*** - *Contact metamorphism in the Bergell aureole: behaviour of antigorite*

Antigorite forms a polysomatic series of discrete composition that are chemographically colinear with chrysotile/lizardite, $Mg_3Si_2O_5(OH)_4$, and talc, $Mg_3Si_4O_{10}(OH)_2$. The compositional variations of antigorite correspond to discrete changes in the lattice parameter *a*. A complete suite of antigorites, collected from a cross-section representing increasing metamorphic grade through the Swiss and Italian Alps has been studied by optical and transmission electron microscopy. The specimens within this suite range from those formed near the lower stability limit of antigorite (~ 250C) to those formed near the breackdown temperature (~ 550C). The lower grade samples belong to the regionally metamorphosed upper Pennine Ophiolites of the Oberhalbstein-Malenco area, while higher grade antigorites were obtained from regionally metamorphosed Malenco serpentinites. The highest grade samples are also from Malenco, they underwent a later contact metamorphism within the thermal aureole of the Bregaglia Intrusive.

The lattice parameter *a* of antigorite evolves from longer (60 Å) to shorter (35 Å) values with increasing metamorphic grade. However, individual antigorites almost invariably show also heterogeneous distribution of *a* periodicities, with the highest values close to grain boundaries or reaction fronts and lower values towards the grain centers. The crystal chemical evolution of antigorite, expressed by reduction in *a*, is usually accompanied by increased crystallinity. Under the TEM, this is seen as an increase in crystallite size and decrease in the number of crystal defects (that are twinning, polysomatic disorder, modulation dislocations, wobbling, offset).

The structural and compositional evolution of antigorite requires intracrystalline diffusion and reconstructive transformations at relatively low temperatures. Therefore the process of evolution is sluggish. Equilibrium is frequently not attained and relics of chrysotile may be observed in high-metamorphic rocks of the Bergell aureole, where antigorite coexists with new-formed olivine. Only at one locality is there evidence of «equilibrium»: antigorite formed at 435 C and has $a = 43$ Å, it shows very little variation in the *a* periodicity, and it is characterized by a homogeneous annealing texture. A geothermometer based upon *a* periodicities, as proposed by KUNZE (1961), has limited pratical applicability.

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MESSINA A.*, BARBIERI M.**, COMPAGNONI R.***, DE VIVO B.****, PERRONE V.****, CALANDRA M.*, SCOTT B.A.***** - *Geological and petrochemical features of the Sila Massif (Northern Calabria, Italy)*

The Calabrian-Peloritan Arc is a segment of Alpine Mediterranean chain connecting the N-W trending Apennines with the E-W trending Maghrebides. It is a nappe pile, including thrust sheets, from both a pre-Alpine crystalline basement and Mesozoic ophiolitic sequence. In the Arc two sectors have been distinguished, which are characterized by different alpine evolutions.

In this study geologic, petrologic and geochemical data of Hercynian granitoids from the Sila Unit — northern sector — are discussed. They extend over an area of about 400 km² from Cerva to Rossano. They intrude into both low and high-grade metamorphic rocks developing wide thermal aureoles.

The Sila granitoids form a composite pluton where sin-late to post-tectonic intrusions were recognizes. The intrusive suite ranges in composition from leucogabbro to leucomonzogranite, with prevailing tonalite and granodiorite.

Petrographic and moda data show the presence of the following seven «*main igneous units*»: 1) biotite-amphibole tonalite, 2) biotite tonalite amphibole bearing, 3) biotite tonalite, 4) biotite-amphibolite tonalite to granodiorite, 5) biotite tonalite to granodiorite, 6) biotite granodiorite, 7) biotite-muscovite granodiorite to monzogranite cordierite bearing. Units 1) to 3) are sin-late tectonic, whereas 4) to 7) are late-tectonic.

Several «*subordinate igneous units*», ranging in composition from granodiorite to leucomonzogranite were also recognized; they are characterized by the presence of the assemblage two micas + andalusite +/— sillimanite +/— cordierite.