in the inclusions and the absence of Cr_2O_3 in the host rock is firm evidence that these inclusions have not been derived from the basanite magma.

The course granular texture of the inclusions, coupled with the relatively high Al_2O_3 content in the spinel as well as in the pyroxenes and the low content of Cr_2O_3 in spinel, are indications of high-temperature equilibration. Further evidence is provided by the high value of the distribution coefficient of Mg between the two coexisting pyroxenes.

The results obtained in this study have confirmed that the Bayuda spinel-lherzolite inclusions are accidental in origin and must have been incorporated in the host rock from a source within the upper mantle. Since these inclusions occur in an area that had undergone volcanic eruptions, it is more likely that they have been brought to the surface by the basanite magma.

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Department of Geology, University of Khartoum, Sudan   S. EL D. HAMAD

Idocrase from the Boutadiol Valley, near Quérigut, France

THE main purpose of this note is to record the analysis (Table I) of idocrase from contact rocks in the Boutadiol Valley, near the southern border of the Quérigut granite. At this locality light-greenish-grey idocrase is found in calc-silicate hornfels exposed near an old magnetite prospect that had been described briefly by Lacroix (1900) during his classic studies of the Quérigut granite and its contact rocks. The calc-silicate rocks consist of clinozoisite, diopside, idocrase, calcite, and apa-tite, accompanied by minor quartz, sodic plagioclase, and microcline. Apatite is locally present in two samples in which it forms largely mono-mineralic areas up to 5 mm across. Typical samples of the calc-silicate rocks, collected by Dr S. O. Agrell and, later, by W. A. Watters, are held in the Department of Earth Sciences, Cambridge (catalogue numbers 61305 and 61633); a small duplicate sample and thin sections are held in the N.Z. Geological Survey collection as no. P16014. Physi-

TABLE I. *Chemical analysis and spectrographic data on idocrase from Boutadiol Valley, near Quérigut, southern France*

	wt. %	Ions on basis of 76 (O, OH, F)				
SiO_2	37.19	Si	17.676	} 18.00		
TiO_2	0.42	Al	0.324		Spectrographic	
Al_2O_3	17.92	Al	9.713		data (μg/g)	
Fe_2O_3	1.74	Fe^{3+}	0.622			
FeO	2.60	Ti	0.151		Cr	121
MnO	0.22	Be	0.251	} 13.04	Sr	248
MgO	1.67	Mg	1.182		Cu	7
CaO	34.84	Fe^{2+}	1.033		Ni	50
BeO*	0.22	Mn	0.088		Co	8
Na_2O	0.18	Ca	17.736		Ga	22
K_2O	0.03	Na	0.166	} 18.11	Ge	5
Li_2O	0.10	K	0.017		Be	807
F	2.00	Li	0.188		V	127
H_2O+	1.50	F	3.006	} 7.76		
H_2O-	trace	OH	4.756			
P_2O_5	0.01					
	100.64					
$-O \equiv F$	0.80					
	99.84					

Gravimetric analysis by W.A.W., spectrographic data by R.R.B.
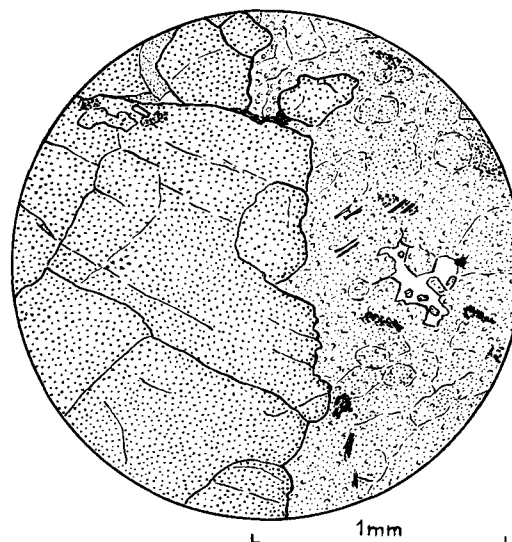* Be determined spectrographically.

FIG. 1. Sketch of idocrase-rich contact rock, Boutadiol Valley, showing fine-grained apatite, on right-hand side, against idocrase. Other minerals shown are minor fine-grained clinozoisite, forming narrow prisms within the apatite-rich area, calcite (at top left, in fine stippling), and quartz interstitial to euhedral apatite.

cal properties of the idocrase are: colourless in thin section; ω 1.703, ε 1.697; dispersion slight; imperfect prismatic cleavage (fig. 1).

The apatite (ω 1.634, ε 1.630) forms small irregular masses made up of numerous tiny prisms between 0.02 and 0.25 mm in width, locally accompanied by minor quartz, microcline, clinozoisite, and calcite (fig. 1). The texture gives no certain indication of the time of formation of the apatite relative to idocrase, but from the irregular boundary of the apatite-rich areas against the ends of some of the idocrase crystals (fig. 1) the apatite is judged to be the later.

The structural formula of the idocrase (Table I) corresponds more closely to the ideal formula of Machatschki than to that of Warren and Modell (Deer *et al.*, 1962, vol. 1, p. 114), although the figure for the X group (Ca etc.) is low. Deer *et al.*, 1962, *op cit.* and Ito and Arem (1970) point out that the idocrase structure can accommodate significant amounts of various other elements, for example Be. The beryllium and lithium recorded in the present sample were probably introduced from the nearby granite during the crystallization of the idocrase-bearing contact rocks.

Braitsch and Chatterjee (1963) emphasized the wide range of temperature and pressure conditions over which idocrase can form in nature. Later Ito and Arem (1970) showed that under favourable conditions idocrase can crystallize at temperatures

as low as 360 °C at 0.5 kbar. Apatite can likewise form over a considerable temperature range (cf. Deer *et al.*, 1962, vol. 5, pp. 329–30), although its lower temperature stability limit is considerably lower than that of idocrase. Thus Steiner (1977, pp. 56, 90) recorded small amounts of hydrothermal apatite in the zone of high-rank alteration at Wairakei, New Zealand, at temperatures of little more than 260 °C and at a depth corresponding to about 0.3 kbar. The minor apatite in the Boutadiol calc-silicate rocks would thus be consistent with later crystallization relative to idocrase, as suggested by the textural relations, and probably formed during pneumatolytic alteration of the earlier contact rocks with falling temperature. In its relationship to the calc-silicate rock it may be compared with the pneumatolytic apatite found in the Meldon, Devon, aplite and its associated rocks (McLintock, 1923).

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N.Z. Geological Survey, Lower Hutt, New Zealand   W. A. WATTERS

Chemistry Department, Massey University, Palmerston North, New Zealand   R. R. BROOKS

Variscite from Hensbarrow china clay works, St. Austell, Cornwall

HENSBARROW china clay works is situated in the Hensbarrow granite mass, and is approximately 1 km west of the village of Stenalees in the parish of St. Austell. The pit is traversed by several NNE–SSW trending quartz–tourmaline veins (known as stent by the quarrymen) carrying a little cassiterite and wolframite, and the well known Bunny tin mine is adjacent. Wavellite occurs in these veins as delicate creamy-white fibrous crystallized crusts lining cavities, together with local infillings of turquoise and varlamoffite. Pegmatite lenses and irregular veins also occur, and these are particularly common in the eastern part of the adjoining Gunheath china clay works, where they carry quartz, tourmaline, apatite, microcline, orthoclase, zinnwaldite, gilbertite, and topaz, with small amounts of wolframite, cassiterite, stannite, arsenopyrite, columbite, varlamoffite, opal, and torbernite.

The variscite was found as aggregates of sharp pale green transparent orthorhombic crystals to 3 mm in diameter, with individual crystals being slightly less than 1 mm in size. It occurred implanted on the top of a large radiating spray of creamy-white wavellite crystals showing transparent terminations in a cavity in quartz, with large sheaves of zinnwaldite mica and fragments of partly kaolinized granite. It was not unfortunately found *in situ*, being in an irregular pegmatite lens in a large boulder of altered granite lying loose in the bottom of the pit. It is possible that the boulder derived from the neighbouring Gunheath pit, as much overburden had recently been bulldozed from there into Hensbarrow pit.

Drakewalls House, Drakewalls, Gunnislake, Cornwall   R. W. BARSTOW*

* Richard Barstow died on 14 September 1982.

The determination of ferrous and ferric iron in rocks and minerals: addendum

IN a contribution earlier in this volume (Hey, 1982) I referred (p. 115) to a discussion of the rate of breakdown of ferric *o*-phenanthroline solution. The relevant section was unfortunately omitted, but is appended here.

The decay of the ferric o-phenanthroline complex. In view of the observation that, when a solution containing 2 mg Fe^{3+} as *o*-phenanthroline complex was extracted repeatedly with 1% oxine in $CHCl_3$, 125 μg Fe^{2+} were found in the aqueous

layer, it seemed desirable to investigate the stability of the Fe^{3+} complex further.

To 10 ml of a solution containing 2.02 mg Fe^{3+} in N HCl were added 5 ml 20% sodium acetate, bringing the pH to about 5, then 5 ml $\frac{1}{2}$% o-phenanthroline and the mixture bulked to 25 ml and colorimetered at $\lambda 508$ nm at a succession of times after mixing. The initially yellow solution soon became orange and the absorption at $\lambda 508$ nm increased, owing to the formation of the ferrous complex; the observed absorbances are plotted in Hey, 1982, fig. 5, except for an additional observation after 72 hours, when the absorbance was 0.692, corresponding to the presence of 93 μg Fe^{2+} ($4\frac{1}{2}$% of the initial ferric content).

Since the reaction involves reduction of Fe^{3+}, something must be oxidized: if this were the phenanthroline or the acetate ion, the reaction would be monomolecular in Fe^{3+} (since both these species are present in large excess); the observation at times up to 200 min fit reasonably to such a reaction, with a half-life of 5 days for the ferric complex (the straight line in Hey, 1982, fig. 5), but the absorbance after 3 days is far less than this would predict. It seems probable that the ferric complex is capable of oxidizing impurities in the solution; in this case, the reaction must stop when all the impurity is oxidized, and an equation of the form $\varepsilon_t = \varepsilon_\infty - (\varepsilon_\infty - \varepsilon_0)e^{-kt}$ (where ε_t is the absorbance at time t) should fit the observations. Taking

the initial absorbance as 0.162 (corresponding to an absorbance of 0.0021 for the ferric complex at 1 $\mu g\,cm^{-2}$ Fe^{3+} and $\lambda 508$ nm), the final absorbance as 0.702 and k as 0.0035, we calculate the curve shown in Hey, 1982, fig. 5, which extrapolates to 0.702 at 72 hours.

It is clear that the absorbance of the Fe^{3+} complex at $\lambda 508$ nm is not negligible, amounting to about 1% of that of the Fe^{2+} complex; moreover, breakdown after mixing is fairly rapid, though evidently dependent on the nature and amount of oxidizable substances present, and in $1\frac{1}{2}$ hours after mixing it may have doubled. Thus determination of Fe^{2+} by o-phenanthroline may be appreciably in error if much Fe^{3+} is present. Fortunately this does not apply to a determination of Fe^{2+} in silicates by the Riley and Williams (1958) technique: a direct test showed that the Fe^{3+} is complexed adequately by the fluoride present even with excess H_3BO_3 also present, and no Fe^{3+} colour develops.

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Dept. of Mineralogy, British Museum (Natural History), Cromwell Road, London SW7 5BD.   M. H. HEY

International Mineralogical Association: Commission on New Minerals and Mineral Names

A SUMMARY of the principal decisions of the Commission appeared in *Mineral. Mag.* **43**, 1053–5 (1980), and authors are reminded that the names there recommended must be used in papers intended for *Mineral. Mag.* Dr M. Fleischer has drawn attention to a few errors and omissions in this report:

To the list of names recommended by the Commission, add:

Churchite, not weinschenkite
Cryptomelane, not ebelmenite
Greigite, not melnikovite

Matildite, not schapbachite for low-temperature $AgBiS_2$, with schapbachite for the high-temperature polymorph
Psilomelane, not manganomelane for hard unidentified Mn oxides
Pyrolusite, not polianite
Romanechite, not psilomelane for the specific Ba–Mn oxide
Stibarsen, not allemontite for the compound [AsSb]
Titanite, not sphene

To the list of multiple names not considered or

not agreed about by the Commission, add (the first will, in each case, be used in *Mineral. Mag.*):

Blödite, bloedite, astrakhanite
Picromerite, schoenite, schönite

The Commission approved (14 to 1) a statement on the relative importance of the holotype material and its original description:

Given that type material of a species exists, and that the original description is not so defective that, in the opinion of the Commission, it bears no reasonable resemblance to the material, the species is to be defined by reference to the type material rather than to the original description.

This vote implies that errors in the original description can be corrected by reference to the type material, and cannot be held to discredit a species unless the original description was, in the words of J. D. Dana (1868) so grossly inaccurate that 'a recognition of the mineral by means of it is impossible'.

The Commission has approved the recommendations of the AIPEA Nomenclature Committee for the naming of regular interstratifications (*Am. Mineral.* **67**, 394-8, 1982) and its application to alliettite, corrensite, kulkeite, rectorite, tarasovite, and tosudite.

The Commission has also approved the discrediting of the following species or names (in addition to those listed in *Mineral. Mag.* **38**, 103 and **43**, 1054):

Badenite (Poni, 1900), is a mixture; a topotype specimen consists of rammelsbergite, nickeline, and bismuth; no other type material could be traced

Epigenite (Sandberger, 1869) is also a mixture; three topotype specimens (all that could be traced) were examined

Kanaekanite (Povarennykh and Dusmatov, 1970); this name was applied to material now shown not to have the ekanite structure and is therefore unsuitable

Kurgantaite (Yarzhemski, 1952) is a mixture of strontian tyretskite and celestine (von Hodenberg and Kühn, *Kali und Steinsalz*, **8**, 206, 1980)

Lavrovite (Koksharov, 1867) is a chromian diopside (*Neues Jahrb. Mineral., Monatsh.* 189, 1979)

Mossite (Brögger, 1897) is a tantalian ferrocolumbite (*Mineral. Mag.* **43**, 553, 1979)

Strontiohilgardite (Braitsch, 1959) is a strontian tyretskite (von Hodenberg and Kühn, *loc. cit.*)

Taprobanite (Gübelin, 1979) is taaffeite

Tarasovite (Lazarenko and Korolev, 1970), an interstratification of mica and smectite, has insufficiently regular lavering to be accepted as a species (*Am. Mineral.* **67**, 396, 1982)

Wilkeite (Eakle and Rogers, 1914) is an unnecessary name for material intermediate between fluorellestadite and apatite

Previous reports on the Commission's findings appear in *Mineral. Mag.* **43**, 1053-5 (1980), **38**, 102-5 (1971), **36**, 1143-5 (1968), **36**, 131-6 (1967), and **33**, 260-3 (1962). Fuller reports, including the votes cast on each species, name, or proposal, appear at irregular intervals in *Bull. Soc. fr. Minéral. Cristallogr.* (now *Bull. Minéral.*), the latest (no. 53) in *Bull. Minéral.* **104**, 694-706 (1981).

A summary also appears in *Zap. vses. min. obshch.* **111**, 335, together with a list of cyrillic and English spellings of minerals described in 1980-1 (Шаховит, named for Ф. Н. Шахов, is, however, improperly transliterated as shahovite).

<div align="right">M. H. HEY</div>

Note. As from 1 January 1983, Dr J. A. Mandarino will be taking over as Chairman of the Commission, and authors of proposed new mineral names should send details to him at: Dept. of Mineralogy and Geology, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, Canada M5S 2C6.