All three polymorphs exhibit a single broad asymmetric band at 140 cm^{-1} (not shown), the assignment of which is not known.

Conclusions. The variation in spectra described here for the three polymorphs differs from that described previously for various specimens of leadhillite (*sensu strictu*) by Russell *et al.* (1983) who showed that the relative intensity of OH, CO_3, and SO_4 absorption bands varied, and proposed that mutual substitution of these ions occurs within the leadhillite structure.

The X-ray powder pattern of macphersonite is distinctly different from those of susannite and leadhillite (Livingstone and Sarp, 1984), which themselves, as reported by Mrose and Christian (1969), are virtually indistinguishable. It is shown here, however, that all three polymorphs are readily distinguished by their IR spectra. Moreover, the appearance in a high resolution IR spectrum of the closely spaced 691, 687 cm^{-1} doublet may be diagnostic for macphersonite.

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Discovery of volkonskoite

STANDARD texts (Ross and Hendricks, 1945; Hey, 1955; Strunz, 1966; Nemecz, 1981) all attribute the first description of the mineral volkonskoite to Kämmerer (1831). However, in his account (taken from the letter, dated 10 April 1831, he sent from 'Petersburg' to von Leonhard) Kämmerer merely states:

> 'Im vorigen Sommer wurde im Ochansky'schen Kreise des Gouvernements Perm ein neues Mineral entdeckt; das zu Ehren des Herrn Ministers des Kaiserlichen Hofes, Fürsten Wolchonskoy, Wolchonskoit, benannt worden ist . . .'

and then goes on to give a description: nowhere does he claim to have found or named the mineral. Moreover, in his paper (which seems to have been largely neglected) giving the first analysis of volkonskoite, Berthier (1833) states that 'la découverte de cette substance a été annoncée dans le *Journal des mines russes* [my italics], l'année dernière'.

As this could not refer to Kämmerer's account, published in a German journal, a search was instituted of *Gornyi Zhurnal* for the period between Summer 1830 and the appearance of Berthier's paper. This resulted in the discovery, in the issue published on 26 November 1830, of a paper (Anon. 1830) in Russian entitled, 'Description of the occurrence of a green-coloured mineral discovered on a certain estate in the Province of Perm and named in honour of Mr Minister of the IMPERIAL Court *Volkonskoite*'—an article that gives information on the stratigraphy of 'Mount Efimyata' (presumably near the village of Efimyata—Pustovalov, 1928), on which the mineral was found in July 1830, together with a detailed description of the mineral and its mode of occurrence. Unfortunately, it is anonymous and consequently the author (who clearly had first-hand information) cannot now be traced, although he might have been one of the editors of the journal or, perhaps, the 'apothecary Helm' who first detected the presence of chromium. As this was done in Ekaterinburg (now Sverdlovsk), the reference is most probably to F. Gustav Helm who described various mines and smelters in that neighbourhood in 1832-3. In any event, the proximity of the date of publication to the date of discovery seems to preclude the existence of an earlier account.

It would appear, therefore, that in his letter to von Leonhard, Kämmerer was merely quoting from the article that had appeared in *Gornyi Zhurnal* some $4\frac{1}{2}$ months earlier, without giving any reference—as was then common. The discoverer of volkonskoite must therefore remain unknown, at least for the present—a conclusion also reached by Pustovalov in 1928, but completely overlooked in the interim.

In connection with volkonskoite it is interesting to note that a grass-green clay, described in virtually identical terms to volkonskoite and discovered in Sweden in 1782, was analysed by Hisinger in 1815 and found to have 10% Cr_2O_3. It seems highly likely that this material, although somewhat aluminous, contained a considerable proportion of volkonskoite. Had a 1:1 mineral been present the colour would probably have been blue (Maksimovic and White, 1973): moreover, the USSR material underlies cupriferous sandstone (Chukhrov, 1955) and the Swedish clay was found in a copper mine (Hisinger, 1815).

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A one-stage precision polishing technique for geological specimens*

HIGH-QUALITY flat polished surfaces on geological specimens for reflected light, microprobe, or cathode luminescence studies have always been difficult to achieve quickly and simply. The most common polishing technique is to use diamond compounds in decreasing grain sizes involving up to five or six changes of polishing grade. For specimens of moderate hardness each grade may need to be used for several hours followed by meticulous cleaning prior to using a finer grade. This paper outlines a technique that requires only one aluminium-oxide polishing stage with a total polishing time only a fraction of that of conventional diamond techniques but the standard of polish meets the highest standards required.

The technique was first developed using the Kent Mk II polishing machine but the method and times given here are for the Buehler Ecomet III and the

* Read on 27 April 1983