

HOWLITE AND ULEXITE FROM CARBONIFEROUS GYPSUM AND ANHYDRITE BEDS IN WESTERN NEWFOUNDLAND — ADDENDUM

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In our previous paper (Papezik & Fong 1975) we described new occurrences of howlite and ulexite in Newfoundland and Nova Scotia, came to the conclusion that small quantities of borates ought to be common in bedded gypsum and anhydrite deposits, expressed surprise over the lack of reports of this association in major geological publications, and asked for references to published papers that we may have missed.

Dr. M. Fleischer has kindly sent us a list of such papers, which we include in the References at the end of this note. These publications show that the calcium sulfate deposits of the Atlantic Provinces of Canada are not unique in this respect, and that similar association of borates with beds of gypsum and anhydrite has been found in Oklahoma, West Germany and the USSR (Central Asia and the Don Basin).

At the same time, both the geographical distribution of the reports and some of the papers themselves make it clear that this association is not considered to be commonplace. For example Koritnig, writing one hundred years after Henry How's discovery of borate minerals in the gypsum deposits of Nova Scotia, refers to his discovery of ulexite in the gypsum quarry at Niederellenbach in Germany as "the first occurrence in Europe" (Koritnig 1965, p. 31).

Thus the main problem still remains unsolved. Consider that in 1973, Canada and the U.S.A. together produced nearly one-third of the world production of gypsum and anhydrite from 83 quarries (Canadian Minerals Yearbook, 1973; U.S. Minerals Yearbook, 1973). With the exception of the occurrences in Oklahoma (Ham *et al.* 1961) and in New Mexico and Louisiana (Fleischer, pers. comm. 1976), we still do not know of any reports of borate minerals in the numerous remaining gypsum and anhydrite deposits in North America outside of the Canadian Maritimes. If such occurrences have been described in local publications or company reports not available to us, we would welcome

further references or reprints. A renewed search for borate minerals in gypsum quarries may well result in a discovery that they are indeed common in all gypsum deposits. However, if careful investigation shows that borates are *not* ubiquitous in bedded gypsum deposits of marine origin, we shall still be faced with the problem of special conditions (whether depositional or erosional) for the borate-containing calcium sulfate beds, as pointed out in our paper.

We wish to thank Dr. Fleischer for the references he has supplied to us.

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