

Michael E. Taylor
Department of Geology Utah
State University Logan, Utah

April 12, 1963

Dr. Tracy Y. Hall
Director of Research
Brigham Young University
Provo, Utah

Dear Sir:

Recently I discussed a problem, with which I am presently confronted, with Dr. Garth Lee of the Utah State University Department of chemistry. Dr. Lee was of the opinion that you may be able to offer some suggestions as to its solution.

I am currently engaged in research under the direction of the USU Department of Geology. My work consists, in part, of determining the environment of deposition of a particular Lower Devonian formation in the Bear River Range. My immediate problem is in demonstrating the presence of free-carbon in the rocks of the formation.

The rock, when finely crushed and viewed under a microscope, shows fragments of dolomite, $\text{CaMg}(\text{CO}_3)_2$; calcite, CaCO_3 ; and quartz, SiO_2 , as well as small opaque Black "specks" which may be carbon. The carbon occurs in very small quantities in relation to the other minerals (approximately 1 part C to 400 parts other minerals).

I have tried two chemical tests to verify the carbon. The first test consisted of dissolving the crushed sample with dilute hydrochloric acid to remove the carbonate minerals.

Next I oxidized the carbon (?) and formed a white precipitate in calcium hydroxide. The white precipitate was very weak and not conclusive.

The second test was the same as the first except barium hydroxide was used. Again the precipitate was weak and in as much as barium hydroxide readily combined with carbon dioxide from the air I was reluctant to draw any conclusions. The presence of carbonate in the original rock also leads me to be rather skeptical of the precipitate.

Now that you are acquainted with my problem, I am hoping that you will, if possible, give me some advice as to other, more conclusive, chemical tests or possibly a microtechnique that may be used to determine the presence of carbon in very small quantities. Any suggestions or advice you may have concerning this problem would be sincerely appreciated.

Very Sincerely,
Michael E. Taylor
Graduate Assistant
Dept. of Geol. USU

April 16, 1963

Mr. Michael E. Taylor
Department of Geology Utah
State University Logan, Utah

Dear Mr. Taylor:

With respect to your problem of identifying the carbon occurring in the rocks mentioned in your letter of April 12th, I suggest that you treat the crushed sample with dilute hydrochloric acid to remove the carbonate minerals. Then I recommend that you mechanically separate a few milligrams of the black "specks" from the quartz crystals. After washing the black "specks" thoroughly with distilled water, have an x-ray diffraction picture taken of the material. If the material is graphite, this should be readily determinable. If it is something else, the x-ray diffraction pattern may give you a clue as to its identity.

Very truly yours,

H. Tracy Hall Director of
Research Room 224 ELB

HTH/jk