FORTY YEARS OF MICROTEKTITE RESEARCH.

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I first heard of tektites when I took Brian Mason's geochemistry course in 1965. Shortly thereafter, I found some glass beads, which I concluded must be microtektites related to the Australasian tektites, in five sediment cores from the Indian Ocean [1]. I then searched for and found Ivory Coast microtektites in cores from the eastern equatorial Atlantic Ocean [2]. Bill Cassidy obtained some compositional data, which helped confirm the identification of the microtektites [e.g., 3]. After this, I searched for North American (N.A.) microtektites, but before I could find them, Donnelly and Chao [4] reported finding them in an upper Eocene sediment core from the Caribbean Sea. Using biostratigraphic data from that core, we were able to find the N.A. microtektite layer in additional cores. We then discovered clinopyroxene-bearing (cpx) spherules associated with the N.A. microtektites. This layer was found to be associated with an Ir anomaly [5] and with the extinction of several radiolarian taxa. We traced the cpx spherule layer across the equatorial Pacific Ocean and into the eastern equatorial Indian Ocean. We first thought that the N.A. strewn field extended across the Pacific Ocean and into the Indian Ocean, but we later concluded that the cpx spherules belong to an older event. N.A. microtektites were then discovered in marine sediments on Barbados [6], and, so far, this is the only place where microtektites have been found on land. Because some authors referred to the upper Eocene cpx spherules and crystalline spherules at the Cretaceous-Tertiary boundary as microtektites, we realized the need for another term for impact spherules which had partly crystallized; we called such spherules microkrystites [7]. In 1987, Jean Thein reported finding an 8-cm-thick layer of N.A. tektite fragments, microtektites, and shocked mineral grains in a core from the NW Atlantic off New Jersey [8]. As a result of this discovery, we searched for and found shocked quartz, coesite, and stishovite at the other N.A. microtektite-bearing sites and in the Australasian microtektite layer. Later, we found, in the N.A. microtektite layer, shocked zircons containing a high-pressure zircon polymorph, which we named reidite [9]. Although some authors have proposed numerous upper Eocene microtektite/spherule layers, today most authors agree that there are only two: 1) the cpx spherule layer (from the Popigai impact crater); and 2) the slightly younger N.A. microtektite layer (from the Chesapeake Bay impact crater). Searches for microtektites belonging to the Central European tektite strewn field have, so far, been fruitless. As of 2005, Australasian microtektites have been found in ~50 cores. Data from these cores suggest that the source crater may be ~43 ± 9 km in diameter and may be in N. Vietnam or in the Gulf of Tonkin.

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