TEKTITES OF COCO GROVE

(PART II)

By D. VAN EEK

DESCRIPTION

The tektites of Coco Grove have a fresh appearance and some of them show very tiny protuberances. Many specimens are broken by rolling through the iron screen, they can not have been transported. Consequently, they must be lying in the same place where they fell. Nearly all of them show a flat or slightly round bottom side, presumably the side they fell upon. The flat bottom side shows the typical chicken skin pitting but in most cases no grooves; the upper side shows grooves as well as pitting. Sometimes larger holes are seen on the surface but these can be considered as only a coarser pitting. Queer curves and spiral-lines are sometimes shown on the surface; these are considered to be fluxion lines.

CAUSE OF THE LINES OF FLUXION

When a meteorite (or tektite) enters the earth atmosphere with a cosmic speed of ca. 100 km. per second (62 miles per second) its temperature of the skin and interior is raised due to friction with the air. Only the surface temperatures can reach a very high temperature ca. 1500° C) and can become fluid, and commence to give off light at ca. 150 km. above the earth's surface. The high temperature penetrates only about 1 mm. into the body and the interior rises only very slowly in temperature. Consequently the larger the body, the cooler the center; on its way toward the earth the fluid material flows over the surface and is wiped off forming the fiery tail of the meteorites (or tektites) and drawing lines on its surface, the fluxion lines, which can form queer spirals due to the rotation.

CAUSE OF THE SURFACE PITTING

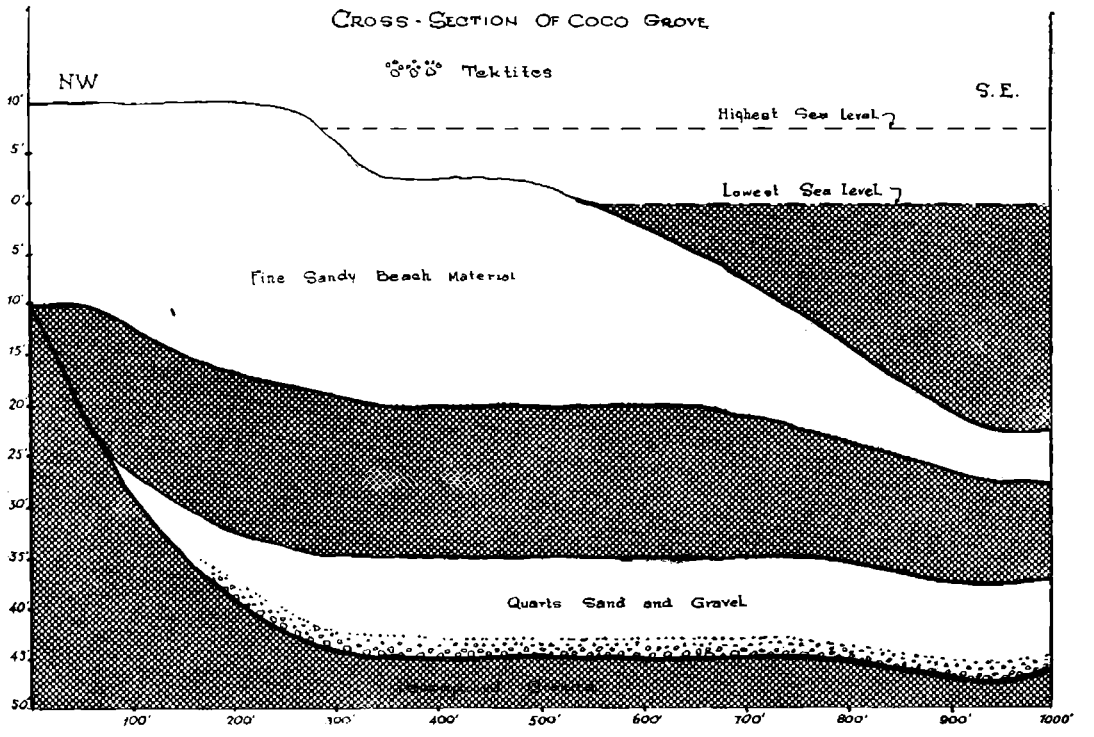
The chicken-skin pitting has been caused probably by rapid cooling. It has been believed by some authorities that the pitting is caused by small pieces being broken off the surface by friction of the air, causing the chicken-skin pitting and larger holes. But the latter is impossible for pitting is also found on broken fragments.

CAUSE OF THE GROOVES

The grooves are also considered by some to be caused by etching and have been produced artificially by fluoric acid on a fresh tektite surface. But examination of the larger specimens showing clear and regular grooves show that the grooves are cracks probably caused by the shock when the tektite hits the earth surface. Before they reached the ground tektites assume a sphere (or drop) form. We consider a sphere of a homogene substance dropped down just as a tennis-ball drop upon an unyielding surface, the sphere will transform itself to an oval as soon as it hits the ground.

But as silica glass is nonelastic as a tennis-ball, it will soon be impossible for it to transform any further and then it will break; cracks will appear in two systems. One system of crack will be perpendicular to the direction of the largest expansion (extension), these are called *tension cracks.* The other system will occur at an angle to the direction of the largest contraction (pressure); these are called *shear cracks.*

Other geologists consider that the pitting is caused by etching with fluoric acid which might be present in the ground water. In the mines near Coco Grove no fluor-minerals are known to occur, consequently there will be no fluoric acid in the ground water and a stronger reason is that clear transparent quartz crystals are found in the same sands containing tektites. Those crystals are not etched. Why should the silica of the tektites have been etched and the silica of the quartz remain unaffected?



METHOD OF OPENING CRACKS

In most instances, the bottom of the grooves is found covered with some reddish material which simulates burned clay, consequently, the tektites might have fallen at a time when the entire Coco Grove property was covered with sea, marsh, or mud flat, on the bottom of which the clay was lying. Considering that the tektites were falling into the water or marshy land, the surface layer would be cooled off more slowly and retained a greater plasticity. Therefore, the surface layer reached first the stage of cracking while the inside kernel (containing a gas-hole) could transform itself still further without cracking and tore the cracked pieces of the surface layer out of each and opened up the cracks. That those cracks have been torn apart is still shown by tiny striations on the bottom of the grooves.

Sometimes the surface layer will break off and we find fragments. The larger tektites were more often affected in this manner. These fragments also show striations.

The smaller tektites, that is, those lighter than 80 grams, do not show shear cracks but in most instances tension cracks appear. Below 30 grams they generally possess a slaggy appearance. The white material sometimes found in the grooves is decomposed granitic material from the bedrock.

According to previous examinations changes in temperature will cause scant contraction or expansion of these silicates, therefore, the grooves are not the result of cooling. (As no laboratory work has been done, it has not been proven here).

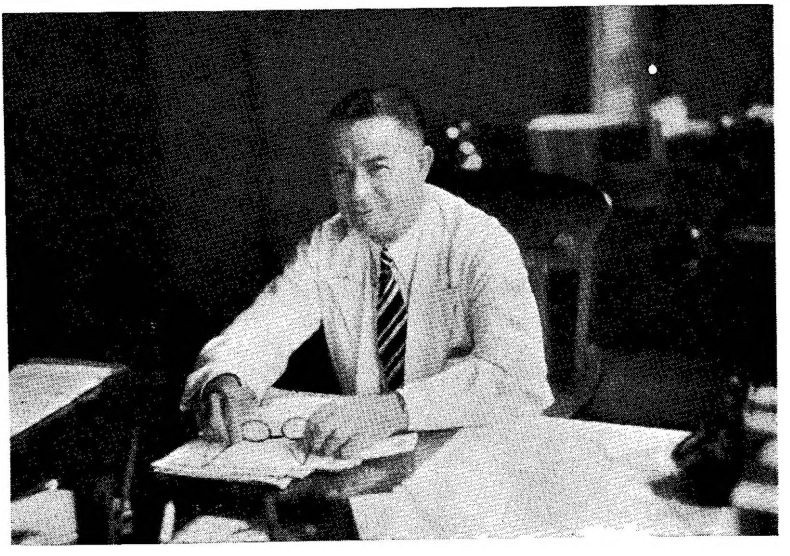
THE AGE OF THE TEKTITES— PLEISTOCENE — OR RECENT?

Shells found in the pay dirt are similar to those which are found on the beach, as far as can be roughly judged. A careful study by an authority on shell forms might date them more exactly. The entire complex of layers may be formed in ca. 20,000 years or less if no layers are missing. If a thorough microscopic investigation should be made of the sand, the exact stratigraphic horizon where the tektites dropped might be found as that place might be marked by large quantities of tiny tektite fragments and probably by changes or burning of the layer. If that is known, a calculation of the age of the covering layers will give the age of the tektites. At least 10,000 years ago the Stone Age people used them as charm stones and made implements of them such as arrow heads, scrappers, etc.

USE—PRACTICAL APPLICATION

The gold panners of Paracale have known for hundreds of years that tektites were characteristic of the sands carrying the largest quantity of gold and consequently they called tektites the Mother of the Gold. As tektite must have been falling shortly (geologically speaking) after the deposition of the pay dirt, they may be useful also in other regions to mark the gold bearing sands.—In addition many University museums are interested in these tektites, and it would be a form of advertisement if Coco Grove Inc. would present some nice specimens as a gift.

Besides marking the pay dirt in Paracale Basin and thus providing a readily visible marker, they maybe useful for correlation purposes, assuming a single fall. In addition, they possess scientific interest as possible representatives of fragments from a source outside of the hemisphere, and consequently having some bearing on earth history and the composition of original material of the earth. As they possess scientific value, a collection of tektites might be saleable to scientific institutions or to other interested persons.



A. F. Kelly, treasurer of the Marsman-managed companies, and of Marsman & Company, left September 21, on the President Coolidge for San Francisco where he will be temporarily attached to Marsman company of California at San Francisco.

Mr. Kelly joined the staff of the company in November 1931. Prior to his engagement with the Marsman enterprises, Kelly had wide and varied experience in finance and banking. A great part of the intricate mine-accounting system used in Marsman operations is the result of his work and instigation.