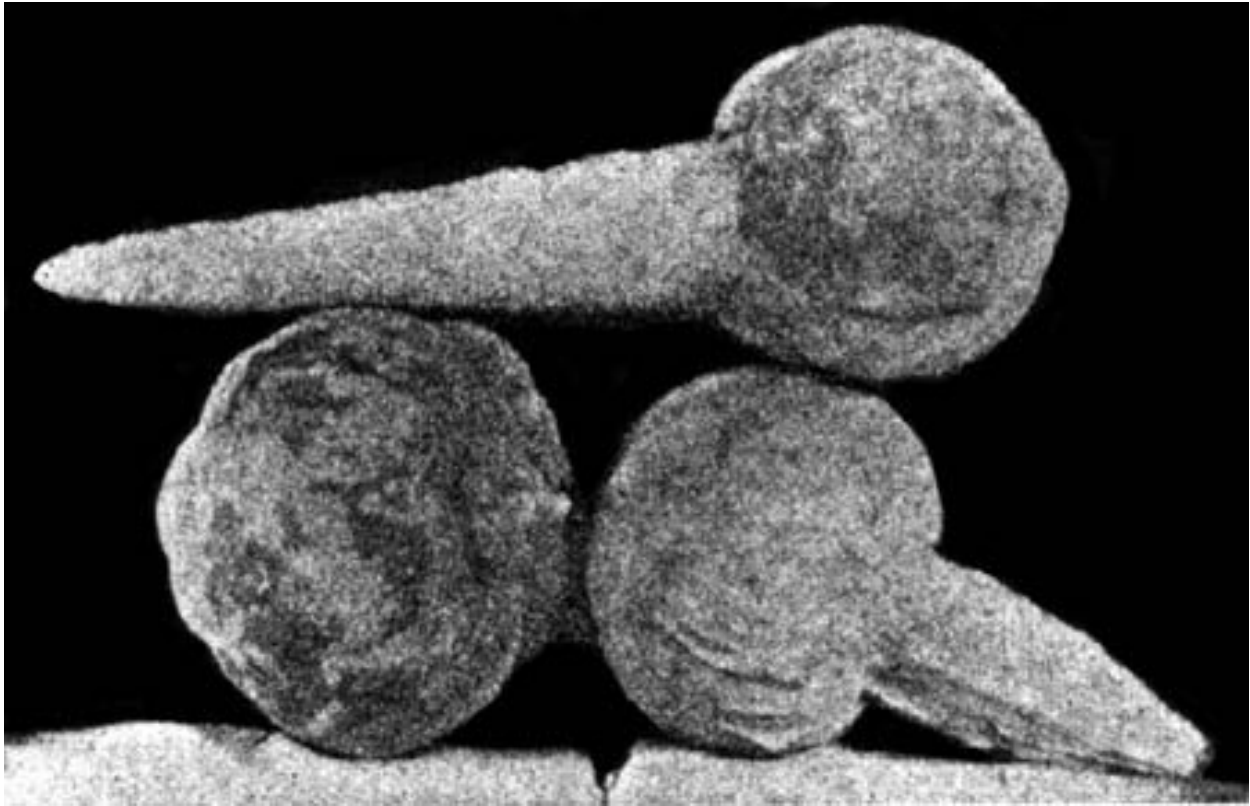


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SAND CONCRETIONS FROM CALIFORNIA

By S. C. EDWARDS

To what organic form their outline could be traced?—was the point which attracted most attention.

Since the location where they are found near Signal Mountain, quite close to the Mexico-California line is indicated on geological maps as old sea beach, it was easy to associate the form of objects with that of the rope-like kelp with globular enlargements.

Among other names suggesting origin, when specimens were shown before the Botanical Club, "Petrified seaweed," "Petrified turnip," "Petrified mushroom" were spontaneous.

Those whose opinions should be worth most call them sand concretions—globular sandstone bodies with stalactite handles. Just how they are formed, whether in horizontal or vertical positions, opinions vary. If those venturing an opinion of the process of formation had the opportunity to study specimens "in position" as well as after removal, deductions would be more satisfactory.

In the locality observed, surface of the ground is eroded into rounded knolls with occasional gullies ten feet deep. Some of the knolls are rocky and too hard to admit of probing with a shovel. The only knoll in which we have found the specimens had a covering of a foot or more of coarse gravel and silt.

On the surface were many sandstone bodies either with handles broken off or with no evidence of a handle. Some of these bodies broken open exhibited a nucleus of a pebble, shell or what appeared to be a three parted seed pod. None of the well formed specimens with a handle revealed a nucleus. On the first visit to the locality, several specimens were collected, having been thrown out by crews of the Highway Department while removing gravel for construction work.

At another time, on which occasion the largest specimens were secured, by probing in a space of about three square yards, fifty specimens were secured at a depth of about a foot. These sandstone balls were four to seven inches through with handles up to twenty inches long. Those totally without handles seemed to be cached by themselves. Then large specimens were excavated without determining whether they were in a vertical or horizontal position.

At a later visit to the field, after probing with a shovel, a "vein" was located about a foot down, under a twelve inch layer of gravel and silt. The specimens were in a layer of fine sand about a foot in thickness—none so large as those secured formerly. These were from one to three inches in diameter with handles that were slim and more frail and up to twelve inches long. These specimens had to be handled with care. By delving under them and removing the fine sand with the fingers from below, specimens were obtained entire.

We soon noticed the specimens were in regular order all arranged with handles perfectly parallel and horizontal, points north. It was soon possible to locate the vein some thirty feet distant to the south and at about the same depth as before, specimens arranged parallel with ball end south. We obtained some two hundred.

Nearly all the specimens secured from former trips showed no evidence of stratification while most of the specimens regularly arranged in the fine sand showed on surface of ball and handle lines of stratification. If these stratification lines are taken to indicate formation in a horizontal position, it may be objected that these lines resulted from becoming imbedded later in sand, part of which adhered to the surface of the specimen. However it is further noticed that some specimens exhibit strata of black mica particles through ball and handle. Such strata can hardly be due to having been imbedded at a subsequent date.

Another item about these specimens worth noting is the fact that many of them being multiples, grown together side by side or end to end, have the handles all strictly parallel. If they were formed in a horizontal position as the stratified ones might indicate, why would the handles, double and treble, all be parallel? Or if they were casts after some plant form on the beach or elsewhere, handles would not always be parallel. Some would likely be found with their legs crossed.

Until the last collecting trip on the ground, I had concluded that the specimens were formed in a vertical position, gravity giving direction to the stalactite handles, single and multiple, and then water had carried them along with the other imbedded material to their present position. However any one finding a vein of specimens imbedded in that layer of fine sand, handles arranged with precision, horizontal and parallel, points north, will lose some of his cocksureness concerning the method of formation.