NOTES AND NEWS

DIASPORE CLAY CAST OF FOSSIL WOOD IN A MISSOURI DIASPORE PIT

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The fire clay deposits of Missouri, including the plastic, flint, and diaspore clays, are strikingly barren of fossils (excepting coal) within the clay itself. Their absence is not surprising because the removal, by leaching, of hard parts of organic remains is to be expected in all of the refractory clays, and particularly so in the diaspore pits where leaching is believed to have been so effective as to remove silica from the kaolinite-halloysite type of clay and leave the alumina-rich diaspore. Obviously this alteration is chemically similar to laterization,[1] and since this is a so-called end process of weathering because of its severity, little of the original material is to be expected to remain intact.

The finding of a specimen of "petrified (?)" wood, a filling of a cavity by diaspore clay formerly occupied by wood, buried within a diaspore pit was so unusual as to be deemed worthy of description. Inquiry of clay miners long experienced in the diaspore region revealed no previous knowledge of a similar occurrence, and a like negative report was given by Mr. McQueen, assistant state geologist. It is the first reported preservation of its kind known to the writer.

The specimen under report was taken by Mr. A. O. Bledsoe, mining contractor of Belle, Missouri, from the Morre clay pit about five miles north of Drake, Missouri. During the mining operation clay containing a small amount of the casted wood material was removed and shipped by workmen who did not realize the uniqueness of their find. Only by accident was the small specimen now at hand saved until Mr. Bledsoe, in charge, returned to inspect the pit. He recognized the unusual filling and sought to recover additional material, but all had been mined and shipped. This part of the Morre pit is now exhausted. Therefore, the specimen to be described is the only one of its kind known to us.

It is a fragment of what was a limb, or stem of a plant, once enclosed but now set to a depth longitudinally of one-third to one-half its diameter within a small clay boulder broken out in mining. The "limb" is roughly circular in cross section, approximatly 4.5 cm. in diameter, and is broken to a length of 10 cm. (Fig. 1). There is no appreciable change in diameter size throughout the length, so the original piece must have been con-

[1] McQueen, H. S., Geologic relations of the diaspore and flint fire clays of Missouri: *Jour. Amer. Cer. Soc.*, vol. **12**, pp. 687–697, 1929.

Allen, V. T., Mineral composition and origin of Missouri flint and diaspore clays: *Appendix IV, 58th Biennial Report, Missouri Geological Survey*, **1935.**

siderably longer. Apparently the wood was at one time buried, later removed but leaving a mold which was later filled with clay material. No wood texture is preserved internally (even microscopically in thin section), but the ribs, irregularities, and texture of the bark are exceptionally well displayed. It twists with a weak right-hand spiral. Some carbonization of the bark took place and this acts as the parting between mold and cast.

Definite identification of the fossil has not been made but Dr. Charles B. Read of the U. S. Geological Survey has reported that it could easily be a "stigmaria."

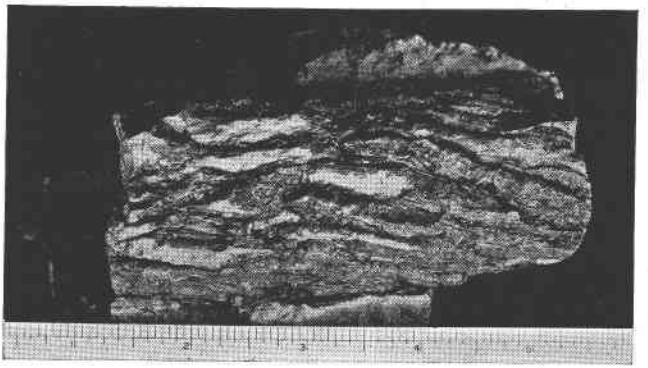

FIG. 1. Fossil wood cast in diaspore clay.

The Morre clay pit was what is known as a coal-bearing, "mixed" pit. A body of soft coal about 40 feet by 25 feet in area and 12 feet deep lay with flint clay at the top of the pit which was roughly 300 feet in diameter and 170 feet in depth. The "petrified wood" occurred at a depth of about 35 feet within the mixed first grade (about 70% Al_2O_3) and second grade (about 60% Al_2O_3) diaspore clay. The specimen will probably contain about 65% Al_2O_3. As was previously stated, the pit as a whole was also "mixed," i.e., contained many alternating, discontinuous lenses and layers of first and second grade diaspore and burley (about 50% Al_2O_3) clay.

The mechanism of the casting offers some interesting relations to the origin of the clay in the pit. If the removal of the wood and filling of the mold took place while the available and surrounding material was still kaolinite or halloysite, the theoretical reduction in volume upon leaching to 65% Al_2O_3 diaspore should have been one-half. The volume reduction was computed on a density basis of 2.6 for kaolinite and 3.4 for diaspore. If leaching of the cast and the mold took place uniformly their fit should

have remained tight, which is roughly now the case. The present volume of the "wood" should be reduced one-half, but the less altered bark should be shrunk like the skin of a drying apple. Perhaps a part of the crenulation of bark is due to this action, although it is doubtful if the volume has been reduced one-half. The writer believes there has been an appreciable amount of alumina freed for solution during the silicate clay hydrolysis and breakdown, and this soluble alumina, after migrating, has been deposited in part of the space left by the removal of silica. Slumping within the clay pit has filled a total of the space vacated by dissolved alumina. Evidence for solution of alumina is the occasional presence of limestone and chert boulders in the pits partially replaced by alumina.

An alternative to the filling of the mold before leaching, would be filling after conversion of the clay to the present diaspore. This would eliminate the problem of volume reduction but introduces one with the bulk transportation of diaspore—not easily solved if our ideas of the transportation of solid hydrated alumina are true. Since a thin section of clay taken across the "wood" appears the same as the enclosing material it seems that filling took place prior to leaching. The writer considers this corroborative evidence for the preferred first mechanism of casting.