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## A Mad Stone

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## UNIT SYSTEMS AND DIMENSIONS.

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T. PROCTOR HALL.

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(*Abstract.*)

[Published in full in *Electrical World* February 7, 1896.]

The three fundamental units of the C. G. S. system are reduced to two when the unit of mass is defined as the quantity of matter which, by its gravitational force, produces at unit distance unit acceleration; and these two to one when the unit of time is defined as the time taken by an ether wave one centimeter long to advance one centimeter. A table is given showing the dimensions of units in each of these three systems, and the advantages of the latter are pointed out.

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## A MAD STONE.

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BY T. PROCTOR HALL AND ERNEST E. FRISK.

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Here and there is found a man possessing a pebble for which he claims the remarkable power of preventing hydrophobia when applied to the wound made by a mad dog. We have been unable to find any record of a scientific examination of a mad stone or a scientific test of its properties. This may be partly accounted for by the rarity of the stone, and the high esteem in which they are held by their owners. A popular idea is that they are formed by accretion in a deer's stomach.

Last summer while visiting the Mammoth Chimney mine, eighteen miles south of Gunnison, Col., a prospector called attention to some small pieces of light-colored rock from the mine, which adhered very strongly to the tongue. Some

specimens were secured as a curiosity, and after being properly rounded, to obscure their origin, were recognized by some of the "old inhabitants" as genuine mad stones. Their curative power has yet to be tested, but in all other respects, apparently, their identification is complete.

The fragments removed from the larger specimen were preserved for examination and analysis. The specimen itself is larger than a hen's egg, light gray in color, with darker specks of iron scattered through; distinctly stratified; with no cleavage planes. The luster on a broken surface is resinous, on a worn surface more earthy. Its hardness, considered as a rock is  $2\frac{1}{2}$ , but the fine powder scratches glass. It is infusible in an ordinary blowpipe flame, and powders easily after ignition.

Under the microscope it appears to be made of flat and irregular transparent granules about 1-500 millimeter thick, some of which are ten times that width, fitted loosely together so as to leave irregular cavities everywhere in communication with each other. The fragments resemble fragments of silicious infusorial shells which are found in large quantities in some parts of the Rocky mountains.

The specimen after remaining some weeks in the air of a dry room (heated by hot air) weighed 70.77 grams. It was placed in distilled water, in which it floated for two or three minutes, boiled for some hours, and allowed to cool. After weighing it was hastily dried with a piece of filter paper and weighed again. Lastly it was dried some hours in an oven at a temperature of  $100^{\circ}$  to  $150^{\circ}$  C, cooled in a desiccator, and weighed.

Weight in ordinary dry air.....	70.77 grams.
Weight in water, saturated.....	39.14 grams.
Weight in air, saturated.....	115.00 grams.
Weight in air, dry.....	69.15 grams.

From this data we get:

Volume of rock in the specimen.....	30.01 cc.
Volume of cavities in the specimen.....	45.85 cc.
Total volume.....	75.86 cc.
Specific gravity of rock.....	2.304
Specific gravity of the whole.....	.912
Volume of water held in ordinary dry air.....	1.62 cc.

Some fragments of the stone were pulverized in an agate mortar, fused with sodium and potassium carbonates, and analyzed in the ordinary way. Before fusion the powder was dried at about  $150^{\circ}$ C. The results are as follows:

	No. 1.	No. 2.
Weight of powder.....	.5882 gram.	.4559 gram.
Si O <sub>2</sub> found.....	95.53%	96.14%
Al <sub>2</sub> O <sub>3</sub> plus traces of Fe <sub>2</sub> O <sub>3</sub> .....	4.59%	4.01%
Total .....	100.12	100.15

The force of adhesion to a wet surface was estimated at 200 grams per square centimeter, or about one-fifth of an atmosphere, but it may be much greater. If applied to a poisoned wound at once it would undoubtedly absorb some of the poison and so assist in the cure. The popular belief in its efficacy has therefore, some foundation in fact.

If more of this rock can be secured it is our intention to test the rapidity of its absorption of moisture from the air when cut in thin slices, with a view to its use as a hygrometer.

The vein in which the specimen was found is twenty feet wide, nearly vertical, and strikes westward. The contents of the vein are chiefly light and dark blue translucent quartzite, mixed with amorphous clay and iron oxide, and bordered by a thin blanket of limestone. Some of the translucent quartzite is mixed with light gray mad stone, as if the firmer portions were formed by fusion of the light gray material. The latter agrees very closely in composition, as well as in appearance, with the silicious shells already mentioned, and was probably formed from them by the internal heat of the vein.

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## PHYSICAL THEORIES OF GRAVITATION.

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T. PROCTOR HALL.

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A force which belongs to individual atoms, is independent of chemical and physical conditions, and cannot be altered or destroyed by any known means, must be closely related to the fundamental nature of the atoms. One of the most essential parts in our concept of matter is mass, and the force of gravitation of an atom is proportional to its mass. Mass and gravitation stand, therefore, either as co-effects of the same cause or as cause and effect. The force exerted by each atom at any point decreases in proportion to the increase of the expanding