



## THE DIVINING ROD MYSTERY

For countless ages a divining rod in the hands of certain mystics has supposedly been capable of locating ore deposits and underground streams, but the stories told of its mysterious virtues were long considered by modern science as mere remnants of medieval superstition.

Recent discoveries in many fields have, however, made the scientist more cautious and tolerant in his attitude towards phenomena disagreeing with his ideas. The divining rod has thus been taken out of the scrap heap to which it has long been consigned and made the subject of many official tests to solve its mystery.

The solution of the problem seems, however, to be near at hand, experiments recently made by E. K. Müller of Zurich showing that the marvelous movements are mainly electrical and magnetic, though only those endowed with a special sensitiveness will respond to them.

Mr. Jäggi-Perard, one of the masters of the divining rod, placed himself at Müller's disposal. The first experiment consisted in keeping a brass pendulum or a divining rod of whalebone over a copper plate charged with electricity. The pendulum would then

move back and forth violently under the action of a negative charge and be silenced by a positive charge, and the divining rod was, according to the sign of the charge, deflected in an upward or downward direction.

Another experiment was made in order further to examine the subject's sensitiveness to electric charges of opposite signs. A set of glass cups belonging to a galvanic battery was placed before Mr. Jäggi who, though

ignorant of the nature of these cups, found his divining rod to deflect alternately upwards and downwards on passing over them.

Incidentally, these experiments show that the human organism, in special excitement, will exhibit sensitiveness and faculties as yet unsuspected.

The French Academy of Scientists has also been investigating the rod of mystery, appointing a commission to experiment with members of the association of so-called sorcerers and diviners. In the report of the proceedings given by Professor Desonval, well-known through his work with electrical currents, it was stated that streams of water could be located at a depth from fifteen to fifty-seven feet with great accuracy.



THE BRASS PENDULUM ACTUATED BY A RING MAGNET BELOW ILLUSTRATES THE PRINCIPLE OF THE OLD DIVINING ROD. WHEN WATER OR IRON WAS BELOW, AT NOT TOO GREAT A DEPTH, THE INSTRUMENT IN THE HAND MOVED

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## INDIAN SUMMER

By John Bannister Tabb.

John B. Tabb was born in Amelia County, Virginia, in 1845. He served as captain's mate on a blockade runner in the Civil War, was ordained a Catholic priest in 1884, and is professor of English literature in St. Charles' College, Ellicott City, Md.



O more the battle of the chase  
The phantom tribes pursue,  
But each in its accustomed place  
The Autumn hails anew;  
And still from solemn councils set  
On every hill and plain,  
The smoke of many a calumet  
Ascends to heaven again.

March 23

Phila

Jenkins

Lying in my bed I gaze intently for 25 pulse-beats at a forty watt incandescent tungsten lamp ten feet removed, the bulb inside a figured frosted globe.

Turning away and burying my face in the pillow, I see a spot of red with a yellow center. The yellow center gets smaller and smaller until gone. <sup>Leaving only red.</sup> The red then ~~begins to~~ <sup>begin to</sup> grow <sup>smaller</sup> smaller in area, with a blue-green boundary, until the blue-green alone remains.

The blue-green area diminishes in area with a glowing halo around it, the blue-green finally disappearing as a tiny black point, leaving only a faint white glowing spot, which in turn gets fainter until nothing remains. The total time for this transition, from initial red spot to the disappearance of the final glow, is about 100 pulse-beats.

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# Small Things

## CURRENT TOPICS.

**Pondering the Imponderable.**—(*Science*, 77, 397.) PROFESSOR OTTO HAHN of the Kaiser Wilhelm Institute, in an introductory public lecture, traced out that border line separating ponderable matter from that imponderable. His course led through the realms of physics, chemistry and biology and the path was plotted by a variety of interesting facts: some new, others that have been mentioned only infrequently.

Today there are analytical balances that will weigh masses of twenty grams to within a millionth of a gram (one twenty-eight-millionth of an ounce). However, such minute accuracy is still inadequate for, as we shall see, many ponderous changes are wrought by imponderable entities. Necessity is the mother of invention and, when required, scientists can devise, other ways and means of accurately determining unweighable amounts. For illustration, take the attempts to extract gold from sea water. Early investigators had placed the gold content of sea water at five to ten milligrams of gold per ton of water (one part in two hundred million). This would mean a total of eight billion tons of gold in all the seas. However, recent experiments by Haber showed that the gold concentration in sea water was actually only one-thousandth as much as originally supposed. All this work led to the development of a microscopic method for determining with certainty a ten-millionth of a gram or less. A similar means was used by Alfred Stock for detecting as little as hundred millionths of a gram of mercury in the saliva, in urine, and in exhaled air as a result of teeth having been filled with poorly made amalgam dental fillings.

It is not so difficult to understand how quantities of a substance as small or smaller than a hundred-millionth of a gram can often exert such widespread effects when we realize that even a quantity that small, represents a cluster of around a million million molecules. Some idea of a molecule's dimensional insignificance may be gained by considering a perfectly evacuated electric light bulb with an opening in it so fine that one million molecules of air enter in one second. Then one hundred million years must elapse before the bulb will fill with air to atmospheric pressure. Or again, suppose that in some way each of the molecules in the two hundred grams of water contained in an ordinary drinking glass could be made visible, could be labeled or tagged. If this glassful of water were then

poured into the ocean and time allowed for its molecules to be thoroughly distributed throughout the waters of the globe, then a glass of water taken at any point would contain two thousand of those tagged molecules. Once more: In a gram of uranium, ten thousand atoms are transformed into lead per second yet seventy-one million years must elapse before one-hundredth of a gram of lead is formed.

The fact that the atoms and molecules of various substances are capable of emitting characteristic rays of light has made possible the detection of as little as a two hundred thousand-billionth of a gram. Some dyes such as fluorescein can be detected at infinitely great dilutions. A solution of twenty-two pounds of this dye was sunk in the headwaters of the Danube, whereupon it showed up sixty hours later in a tributary of the Rhine.

Sense of smell is another remarkable means for detecting minute quantities of such substances that affect the olfactory nerves. The nose is capable of detecting one part of a mercaptan in fifty thousand million of air; an amount equal to one four hundred and sixty thousand-millionth of a gram. Two Swiss naturalists performed the experiment of raising the caterpillar of a butterfly in the city of Zurich where it spun its cocoon and emerged the following spring a female butterfly. Imprisoned in a room with windows open it was only two days when more than one hundred males of the same species had gathered in the room having traveled from the forests several miles away. Such is the power of smell.

Immeasurably dilute solutions of metals such as copper or silver are found to destroy or prevent the growth of certain plants and lower organisms. Witness the recent adoption of finely divided silver as a sterilizer of water, milk and other substances. The ancient Egyptians discovered that open wounds healed better and more rapidly if they were covered with silver plates. Bone fractures are often repaired with silver wire.

In the field of enzymes, vitamins and hormones, we have a class of substances that can exert mighty effects upon living organisms although they are present in almost infinitesimal amounts. A hundred-thousandth of a gram of thyroid secretion will overcome the suspended metamorphoses of salamanders. Tadpoles which fail to develop in iodine-free water grow more rapidly than normal if one part of thyroxine is added to five thousand million parts water. Certain tropical lilies cannot develop normally unless their water habitat contains a hundred thousandth to a millionth of boric acid.

Grain sprouts will not grow if their tips are cut off. These tips were found to contain a minute amount of growth-promoting hormone called "auxin." One fifty thousand-millionth of a gram is sufficient to produce growth. Strangest of all was the discovery that every human being, regardless of age or sex, secretes in the urine an average of two milligrams of auxin daily, an amount far greater than what could be obtained from a thousand sprouts of grain.