

GEOLOGIC PAST

Highlighting articles from past issues of GSA Bulletin

Water through the Hands of Time

GSA Bulletin, September 1908

W.J. McGee (1853–1912)

The Hydrogeology Division of the Geological Society of America was established in 1959 and is GSA's second largest Division. Seven of GSA's Associated Societies focus on the science of water. Here's a look at the science in its infancy.

In "Outlines of Hydrology," published in *GSA Bulletin* in September 1908 (v. 19, p. 193–220), geologist and ethnologist W.J. McGee called for the establishment of the "Science of Water, already known somewhat vaguely as hydrology." McGee justified this call by noting the "transcendent importance of the water of the earth to human welfare" (p. 194) and believed that the study would unite the "formal sciences," such as mathematics, astronomy, and physics, with the "natural sciences" of meteorology, geology, zoology, and anthropology.

Hydrology, in McGee's mind, "would be particularly close with geology and meteorology, since water is at once a terrestrial mineral and agency and a highly effective constituent of the atmosphere" (p. 194–195). In its three states—solid, liquid, and vapor—writes McGee, "the mineral H₂O ... takes a leading role in the play of terrestrial progress ... it is the most effective known agent in determining external terrestrial conditions" (p. 195).

In the bulk of his discussion, McGee defines and characterizes the hydrosphere and the special functions of moving water. Perhaps reflecting his interests as an ethnologist, however, McGee turns his attention to another element of hydrology, what he calls the "ontosphere." McGee defines theontosphere as "a relatively minute fraction of the terrestrial H₂O [that] is withdrawn from the distinctive divisions of the hydrosphere and incorporated into living organisms" (p. 212).

While the volume of theontosphere is relatively small compared to the hydrosphere, McGee notes, "its efficiency in modifying the earth face is disproportionately large: The rate of geologic process on each part of every continent is largely

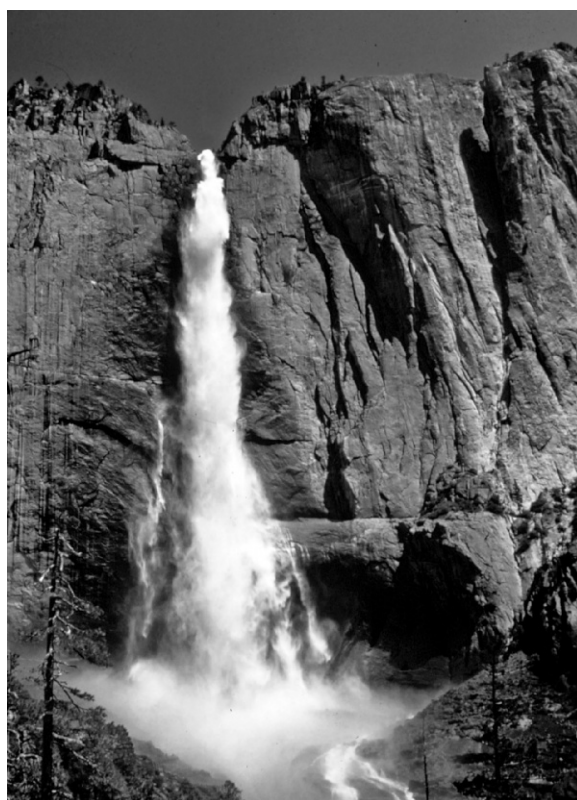


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controlled by the flora and the soil which the floras of the ages have accumulated" (p. 213).

Citing a substantial, but "perhaps too indefinite," correspondence between the work of H₂O within Earth's flora and the fauna and the "virtually autonomous work of running water," McGee continues his discussion of theontosphere's influence on Earth in an almost lyrical fashion: "During each eon the flora itself has been modified and started toward reconstruction by the fauna, as when the cryptograms of the Paleozoic were set on the way to decadence by flower-seeking and pollen-bearing insects, when fruit-bearing trees were placed in the lead by the help of seed-scattering birds, and when man appeared to cultivate the innocuous and exterminate the noxious among the fruits and grains and tubers."

McGee concludes his paper by breaking down the application of hydrology into six functions:

"Functions of the Psychosphere"—that is, "the function of organized intelligence to control natural powers"; the "Use of the Corpus"—the geosociopolitical forces behind the use of water; "Navigation," "Power," "Diversion," and even "Production." Regarding production, McGee proposes that humankind will someday engage in "hydrogeny—the actual production of water through organic decomposition of compound substances: The production of water at will promises to mark one of the two greatest steps in the human aspect of planetary development; the earlier step was the conquest of fire" (p. 219).

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