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**THE DREAMER AND THE PRAGMATIST:
A joint biography of Walter Wetzel and Otto Wetzel, with a survey
of their contributions to geology and micropaleontology
by
Linda F. Dietz, William A.S. Sarjeant, and Trent A. Mitchell**

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ABSTRACT

After a long hiatus, work on fossil dinoflagellates was revived in Germany during the 1920s and 1930s by two geologists who were namesakes, but unrelated -- Walter Wetzel (1887-1978) and Otto Wetzel (1891-1971). An account is presented of their lives and geological work, their contributions to micropaleontology being emphasized and their research approaches contrasted. It is hoped this may enable a greater insight to be gained, not only into their personal academic achievements but also into the peculiar influences exerted upon them by the events which both shaped and destroyed Germany in the first half of this century. Following this article, a comprehensive bibliographical list of works published by Walter Wetzel and Otto Wetzel is presented, with translations of titles.

**THE EMERGENCE OF THE DIVERSITY OF IGNEOUS ROCKS AS A
GEOLOGICAL PROBLEM: PART ONE -- EARLY SPECULATIONS**
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ABSTRACT

Speculation about igneous rock diversity began in the first half of the nineteenth century after acceptance of the existence of ancient volcanism and the recognition of two fundamental types of lava: basalt and trachyte. Before 1850, George Poulett Scrope (1797-1876), Charles Darwin (1809-1882), and James Dwight Dana (1813-1895) attributed diversity to intumescence of gas-rich lava, crystal settling, and differential fusion of minerals. In the 1850s, Robert Bunsen (1811-1899) maintained that lava is derived from two deep normal trachytic and normal pyroxenic sources. Wolfgang Sartorius von Waltershausen (1809-1876), Joseph Durocher (1817-1860), and Ferdinand von Richthofen (1833-1905) universalized Bunsen's sources by postulating a density-stratified Earth in which a layer of acid, feldspathic material rested above a layer of basic, basaltic material. Exploration of the complex volcanic terranes of western America in the 1860s and 1870s undermined the two-source theories and opened the way for the concept of fusion of already solid crust. Prior to 1880, speculations about diversity were typically suggested by naturalists, chemists, and geological generalists with strong interests in the geomorphic or geophysical aspects of Earth. Consequently, the problem of diversity was a peripheral concern to most of those proposing hypotheses. The hypotheses characteristically reflected the professional interests of their proposers. The content of the early speculations was further shaped by the nature of the field areas studied by proposers, and by their views on the correlation between geologic age and igneous rock type. Those, like Scrope, Darwin, Dana, Joseph Jukes (1811-1869), Carl Bernhard von Cotta (1808-1870), and Clarence Dutton (1841-1912), who rejected such correlations, located the source of igneous rock diversity at the surface, within a volcano, or within the acid crust. Those, like Bunsen, von Waltershausen, Durocher, von Richthofen, and Clarence King (1842-1901), who accepted the Wernerian idea that there had been changes in igneous rock type through time were more inclined to attribute diversity to multiple lava sources at great depth.

**NEWTON HORACE WINCHELL, THE GEORGE ARMSTRONG CUSTER
EXPEDITION OF 1874, AND THE “DISCOVERY” OF GOLD IN THE BLACK
HILLS, DAKOTA TERRITORY, U.S.A.**

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ABSTRACT

Rumors circulated for years about the fabulous wealth to be found in the Black Hills, an area in Dakota Territory, U.S.A., ceded to the Sioux Nation in 1868. Although the Sioux Nation was determined to keep all outsiders out, the U.S. government decided to send an expedition into the hills during the summer of 1874, partly to map them for military purposes and partly to quell rumors about gold and other economic commodities.

The expedition was led by Lieutenant Colonel George A. Custer (1839-1876) of the U.S. Seventh Cavalry. Newton Horace Winchell (1839-1914), director of the Geological and Natural History Survey of Minnesota, was invited to join as chief geologist. His official reason for participating was to collect geologic specimens together with skins of animals for a newly formed Museum of Natural History. Prospectors also accompanying the expedition purportedly found gold at several places. Their finds were described in official dispatches written by Custer and in unofficial accounts prepared by newspaper reporters accompanying the expedition. Upon his return from the field, Custer emphasized the discoveries and their economic potential. At about the same time Winchell told reporters that the reports and the newspaper accounts were greatly exaggerated and that he had personally seen no trace of gold. Controversy continued over the next several months, mainly in the newspapers. In late 1874, Custer suggested that Winchell never saw gold because he never looked for it. Custer's view prevailed as pressure mounted to open the Black Hills to exploration. In the summer of 1875, the government sent a second expedition to the hills primarily to resolve the differing views of Custer and Winchell. That expedition found considerable evidence for economic quantities of gold, an act that further inflamed the Sioux. Consequently, many fled the reservation for parts of Montana and in January 1876 the Army was ordered to force the Native Americans back onto the reservation. That campaign led to the Battle of the Little Big Horn and to the death of Custer and his Seventh Cavalry on 21 June 1876. Although Winchell continued to serve as Minnesota State Geologist for 28 years and lived until 1914, he never again mentioned his role in the discovery of gold in the Black Hills.

T. Sharpe and P. J. McCartney, eds., *The Papers of H. T. De La Beche (1796-1855) in the National Museum of Wales*

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Albert V. Carozzi, Bernard Crettaz, and David Ripoll, eds., *Les Plis du Temps: Mythe, Science et H.-B. Saussure*

William A. S. Sarjeant

Albert V. Carozzi, *Horace-Bénédict de Saussure: Discours Préliminaire aux Voyages dans les Alpes*

Keith J. Tinkler

Henrika Kuklick and Robert E. Kohler, eds., *Science in the Field*

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Th. E. Wong, et al., *The History of Earth Sciences in Suriname*

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James H. Rieuwerts, *Glossary of Derbyshire Lead Mining Terms*

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R. A. Davis and R. J. Cuffey, eds., *Sampling the Layer Cake that Isn't: The Stratigraphy and Paleontology of Type-Cincinnatian*

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Interesting Publications

Gerald M. Friedman

Treasurer's Report

Dorothy Sack

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