

EARTH SCIENCES HISTORY

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DARWIN AND THE SEEING EYE: ICONOGRAPHY AND MEANING IN THE BEAGLE YEARS

DAVID R. STODDART

Department of Geography, University of California at Berkeley
Berkeley, California 94720, U.S.A.

ABSTRACT

Strongly influenced by Lyell's Principles of Geology, Darwin during the Beagle voyage developed a highly theoretical geology based on premises of continental uplift and oceanic subsidence. From the beginning he used his theoretical interpretations to validate and select his field observations. These he interpreted and communicated largely in the form of profile diagrams, of South American shorelines, Andean tectonic structures, and coral reef development. His published works from the voyage are very sparsely illustrated, except for profile diagrams, and contain remarkably few maps. Of the latter all are derivative except one. The one exception is his 1842 map of the distribution of coral reefs, which he uses as a theoretical argument to delineate areas of elevation and subsidence in the oceans, implicitly illustrating the formal logical analogy between the nature of theory and the nature of maps. The illustrations in general illustrate the contrast between Darwin's verbal facility in describing landscapes and evoking mood, and his general inability to translate his images into visual representations.

FROM CHARLES DARWIN'S PORTFOLIO: AN EARLY ESSAY ON SOUTH AMERICAN GEOLOGY AND SPECIES

SANDRA HERBERT

Department of History
University of Maryland Baltimore County
5401 Wilkens Ave.

Baltimore, MD 21228-5398

ABSTRACT

This work is an analysis and edition of a previously unpublished essay by Charles Darwin entitled "Reflection on reading my Geological notes." The original draft of the essay appears to have been written in 1834, that is, during Darwin's voyage on H.M.S. Beagle (1831-1836). In the essay Darwin developed a theory of the geological formation of South America that included a narrative framework for the history of life on the continent. His treatment of the history of life is not yet transmutationist, but it is highly sequential.

THE MIND'S EYE: GEORGE G. SIMPSON'S USE OF VISUAL LANGUAGE

LÉO F. LAPORTE

Earth Sciences, Univ. California
Santa Cruz, CA 95064

ABSTRACT

Late in life, the American paleontologist George G. Simpson (1902-1984) remarked that "I compose my writing visually think visually, then translate that into words . . . I visualize at least as much as I verbalize, perhaps more. Even in abstract theory I often visualize first KL then describe in words what I saw mentally." In much of his most significant theoretical work, Simpson did indeed use just such visual language to translate his more original concepts and interpretations regarding, for example, statistical inferences about evolving lineages, relationships of speciation to higher taxonomic categories, ratio diagrams of morphological dimensions, and species-density contouring. Simpson's most interesting and innovative visualizations had to do with organism-environment relationships, including adaptive landscapes, prospective and realized functions of organisms and environments, and especially the adaptive grid upon which he summarized his argument for variable rates and patterns of evolution—"tempo and mode"-in response to differing ecological opportunities available to animal and plant species.

"There [is] much evidence that truly productive thinking in whatever area of cognition takes place in the realm of imagery."-Rudolf Amheim*

“Acceptance of the conceptual importance of visual modes of discourse will require a rather fundamental change of intellectual values within the history of science.”-Martin Rudwick’

“A diagram is no proof! A diagram is no proof?”-Francis Toner⁴

**BECOMING INTERESTED IN EXPERIMENTS:
AMERICAN IGNEOUS PETROLOGISTS AND THE
GEOPHYSICAL LABORATORY, 1905-1965**

CARL-HENRY GESCHWIND

Department of History of Science, Medicine, and Technology
and

Department of Earth and Planetary Sciences

The Johns Hopkins University

Baltimore, MD 21218

ABSTRACT

The establishment of the Carnegie Institution of Washington's Geophysical Laboratory in 1905 and the pathbreaking work conducted there by Norman L. Bowen in the 1910s and 1920s are commonly considered to have rendered igneous petrology an experimental science. A closer examination of the work of American igneous petrologists outside the Laboratory reveals, however, that consideration of experimental data did not become an integral part of petrological practice until after World War II. To be sure, igneous petrologists celebrated the Geophysical Laboratory and its experimental approach in speeches and historical reviews throughout the interwar period. In their actual research, though, most igneous petrologists ignored the large body of experimental results gathered by the Geophysical Laboratory and treated Bowen's theory of differentiation as merely another speculative petrogenetic hypothesis to be tested against field data. These petrologists, many of whom were engaged in mapping for state and federal surveys, regarded laboratory data on simple anhydrous systems as simply inapplicable to real rocks. Not until after World War II, when the Geophysical Laboratory began large-scale experimentation on hydrous systems and natural rocks, did field petrologists generally accept the relevance of experimental data. At the same time, the institutional framework of igneous petrology changed in the late 1940s and 1950s as a number of experimental petrologists took advantage both of support from new government agencies, and of the rapidly increasing prestige of geochemistry within the discipline, to establish numerous new experimental laboratories. This change in the structure of the discipline, coupled with the greater reliance on hydrous systems and natural rocks in experimental work, finally led to the general incorporation of experimentation into petrological practice.

**AMERICAN INTRANSIGENCE: THE REJECTION OF
CONTINENTAL DRIFT IN THE GREAT DEBATES OF THE 1920'S**

ROBERT P. NEWMAN

Department of Communication Studies, University of Iowa, Iowa City, IA 52242

ABSTRACT

Historians of the early debate on the Wegenerian continental drift hypothesis all point to the 1926 symposium of the American Association of Petroleum Geologists as instrumental in turning American geologists against Alfred Wegener. Many of them believe that the anti-Wegener papers presented in this symposium were cogent enough to warrant rejecting all forms of mobilism. I argue herein that neither of the above contentions is well founded. Drift was discussed extensively in the United States before 1926, the symposium in New York was inconsequential compared with the publication in 1928 of what purported to be papers given at New York, and the final contemptuous rejection of drift was sparked by a concerted effort of a few mandarins of the geological community who were deaf to the judgments of foreigners. The coup de grace was administered by Bailey Willis and Charles Schuchert in coordinated articles published in the Geological Society of America Bulletin in 1932.

THE ROGERS-HOTCHKISS GEOLOGICAL MAPS OF VIRGINIA AND WEST VIRGINIA

PETER LESSING

West Virginia Geological Survey
P.O. Box 879, Morgantown, WV 26507

ABSTRACT

During the years 1835 to 1841, the first geological survey of Virginia, and what is now West Virginia, was conducted under the leadership of William Barton Rogers. His geological work was produced in seven annual reports presented to the Board of Public Works, which were reprinted in 1884 as a single volume by his widow. However, the first geological map from Rogers' survey of Virginia was only published in 1876 by Jedediah Hotchkiss.

Rogers gave his geological map to Hotchkiss in 1873 for use in Hotchkiss' book published 3 years later. During the following 10 years, this geological map was produced 13 more times, mostly by Hotchkiss, and each version is slightly different. Some changes are obvious, such as scale, base map, or cross sections, whereas other modifications are subtle, including stratigraphic units, title, or colors. Three versions are hand colored, the others are lithographs. The known versions, by date, are two in 1874, one circa 1875, five in 1880 and one circa 1880, one in 1881, one in 1882, and three in 1884. Interestingly, none of these 14 versions modified Rogers' original geology, although Rogers modified his original stratigraphic nomenclature. A fifteenth version, apparently done without Rogers' knowledge for the Union army in 1862, is the hand colored geological map by Thomas S. Ridgway.