Images of the U.S. Geological Survey, 1879-1979
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by E. L. Yochelson and C. M. Nelson

This collection of photographs reflects 100 years of public service by the U.S. Geological Survey since its founding on March 3, 1879: "... for the classification of the public lands, and examination of the geological structure, mineral resources, and products of the national domain."
The U.S. Geological Survey was founded on March 3, 1879, to consolidate some of the functions of the several Federal surveys that were conducted in the West after the Civil War. The newly organized Survey continued to study the Grand Canyon area.
...... to answer questions posed by John Wesley Powell's exploration of the Colorado Plateau country begun in 1869.

and the ancient rocks that erosion had revealed.
Under Clarence King, its first Director, the Geological Survey continued investigations of significant mining districts, an interest King had pursued as head of the earlier U.S. Geological Exploration of the Fortieth Parallel. King also extended the new agency's work nationally by gathering mineral statistics for the 1880 census.

The Survey also studied western mining districts.
Studies of the Colorado Plateau extended work originated by Powell's Second Division of that territorial survey.
Interest in the Great Basin stemmed in part from 1st Lieutenant George M. Wheeler's U.S. Geographical Surveys West of the One Hundredth Meridian, plus the King and Powell Surveys. Powell, the Geological Survey's second Director, obtained Congressional authority to work throughout the United States to complete a national geologic map but, like King, he was especially interested in the West.
Upon taking office in 1881, Powell emphasized the importance of topographic mapping.
Geological Survey topographers increased the accuracy of contour mapping and devised novel methods of cartographic expression.
Mapping by alidade and stadia rod produced topographic maps at an increasing rate. often under difficult conditions.
Powell first quartered the new and growing agency at the Smithsonian Institution but soon moved to the Hooe and Adams Buildings on F Street, NW., Washington, D.C., where the Survey remained until 1917.
The Geological Survey's principal responsibility, then as now, was to collect, analyze, publish, and disseminate earth science data and interpretations to the public.

produced analyses, maps, and reports for distribution.
In the 1890's, the Geological Survey began extensive field investigations in the East, particularly of the mineral resources in the southern Appalachian Mountains. These investigations were documented in a series of publications called Geologic Folios which included maps of geologic structure.
New studies examined the structures of rocks, .................................................................

yielded new ideas on the folding of rocks .................................................................
....and laboratory investigations attempted to duplicate geologic processes to gain a better understanding of their nature.

and spurred experiments on the formation of mountains.
Throughout this classic period, the Geological Survey emphasized investigations in the field.

Geologists conducted fieldwork, using the best available transport.
Under C. D. Walcott, the third Director, the agency expanded and diversified its activities as it coupled basic and applied studies in support of the mining industry and agriculture. An investigation of the downstream effects of placer mining on farming is an early example of the Geological Survey's concern about the impact of people's activities on their environment.
Studies of ice-age phenomena, especially in the Great Lakes States, continued the agency's investigations of environments and climates of geologically recent times.
Fossil plants and animals became important tools for establishing the geologic age of rocks and correlating them from one region to another.
The Survey was closely associated with the conservation movement during Theodore Roosevelt's era and investigated and surveyed newly established national forests.
At the turn of the century, in order to establish precisely our northern border, Geological Survey specialists joined our Canadian neighbors in a survey undertaken under the auspices of the Boundary Commission.
Under Walcott, the study of the Nation's water resources was placed on a solid basis.
The obvious need for water in the West and underground water led to the formation of the Reclamation Service.
gave rise to the Reclamation Service in 1902; the Director of the Geological Survey also
headed that organization until it became an independent bureau in 1907.

and its work toward supplying water for lands and homesteads in the West.
During the monetary crisis of the 1890's, the Nation and the Geological Survey became interested in the mineral resources (especially gold) of Alaska; even today, work in the North commands a significant part of the Survey's effort through its Alaskan Geology and other branches.
The Survey also responded to the continued growth and demands of America's mineral and fuel industries. In 1910, the Survey's Technologic Branch became the nucleus of the new Bureau of Mines.

Coal research led to the founding of the Bureau of Mines.
During World War I, the Topographic Branch mapped tactical and strategic areas in Europe and the United States, while the Geologic and Water Resources Branches worked to find badly needed strategic minerals, fuels, and water supplies at home.
The fourth Director, G. O. Smith, emphasized classification of the public lands and their resources, including oil shale; this work led to the formation of the Survey's Land Classification Board, established in 1908. It became a branch in 1912 and was renamed the Conservation Branch in 1925 when the supervision of mineral leases was delegated to the Survey.

Work on oil shales began in the 1910's.
The expenses of field work gradually increased and the automobile replaced the horse.

*Transport improved, even in the Grand Canyon*
Accounts had always been kept carefully, but under the eminently practical Smith, the Survey's administrative staff kept a watchful eye on all activities. 

though not everyone went into the field.
The Depression of the 1930's caused a reduction in the activities of many Federal bureaus, but despite this, W. C. Mendenhall, the fifth Director, reemphasized the importance of basic research, and the Geological Survey took initial steps toward more sophisticated methods of gathering data.

Water-resource work occasionally took novel forms.
On the eve of World War II, the Survey responded once more to the Nation's need for strategic minerals and fuels. The Nation's total commitment to winning World War II led to the establishment of the Military Geology Branch, which supplied terrain analysis and other specialized intelligence services. W. E. Wraith, the sixth Director, provided leadership during the difficult war years. In the midst of postwar turmoil, the agency resumed some of its more traditional but equally vital duties. World War II increased the need for mineral-resource exploration and terrain analysis.
In the 1950's, the Geological Survey's research staff expanded under Wrather and T. B. Nolan (the Survey's first Assistant Director, who became the seventh Director in 1956), as a result of increased operational responsibilities, especially the exploration for uranium and other critical ores.

*In the nuclear age, geologists returned to the Colorado Plateau to find uranium.*
The preparation of maps from aerial photographs dramatically increased the rate of coverage of the United States by up-to-date topographic maps.

Topographers developed more sophisticated methods.
The Survey adapted wartime advances in electronics to peacetime uses in science, strengthened research in geophysics, and geophysicists took to the air.
and developed sophisticated analytical techniques in the laboratory.

Laboratory studies became increasingly complex.
The Geological Survey has continued to emphasize the importance of field studies of geologic processes coupled with research in analytical techniques.
Studies at the Hawaiian Volcano Observatory typify this blend of basic field geology and modern analytical techniques.

...... even with changes in clothing.
Along with new tools came new responsibilities in the Antarctic and other diverse locales.
In 1962, Congress granted authority for work overseas, formalizing earlier wartime investigations in Central and South America and postwar studies of the Pacific islands.
Agency specialists used their experience to assist other countries in their efforts to raise the standard of living of their citizens.
Concurrently, the Geological Survey continued to fulfill its domestic responsibilities. Recently, the public has become increasingly aware of natural geologic hazards.

Engineering geology came into its own.
Under the eighth Director, W. T. Pecora, earthquakes, the most dramatic of these hazards, were systematically investigated, and initial attempts were made to predict their occurrence.

The 1964 Alaska earthquake expanded a long-standing interest in the dynamics of the Earth.
V. E. McKelvey, the ninth Director, reemphasized the problems of water supply and quality and the coming shortages of minerals and liquid-gaseous fuels.

Increasingly, water became a national concern.
The results of research as the search for basic geological knowledge continued.
by the scientists and engineers of the Geological Survey have always been applied to
increasing the knowledge of the Nation's natural resources.

by the best available transport.
The concept that our natural resources are limited and must be wisely used and carefully conserved is becoming a matter of wide public knowledge and concern.

*Today, limited natural resources must be evaluated, produced, and used wisely.*
The technique of applying interpretations of the rock record to analyses of the environmental problems of today is increasingly attractive.

*Modern geological processes still provide a key to the past*
but earth sciences are not limited to the land. Studies of the continental shelves and ocean basins, a postwar effort, are a special interest of H. W. Menard, the present Director of the Geological Survey.
Meanwhile, the space age has yielded additional techniques and new vistas for the study of the Earth.

The present-day field area for the U.S. Geological Survey includes the Earth.
Indeed, planetary studies have provided new field areas to challenge the scientific spirit of the agency.
Appendix

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Grand Canyon of the Colorado River, east from Grandview Point, Grand Canyon National Park, Coconino County, Arizona, 1901 (photo by N. W. Carkhuff).

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Upper Granite Gorge, downstream toward Sockdologer Rapids from cliff above Mineral Creek, Grand Canyon National Park, Coconino County, Arizona, 1923 (photo by L. R. Freeman).

Page 4.
Upper Left: Cripple Creek Mining District, Teller County, Colorado; Elkton Mine from Guyot Hill, 1903 (photo by F. L. Ransome).
Upper Right: Cripple Creek Mining District, Teller County, Colorado; Gold Hill from southwest slope of Tenderfoot Hill, 1903 (photo by F. L. Ransome).
Lower Left: Cripple Creek Mining District, Teller County, Colorado; Bull Hill from Raven Hill, 1903 (photo by F. L. Ransome).
Lower Right: Cripple Creek Mining District, Teller County, Colorado; Red Mountain and mines from road to Barstow Mine, 1900 (photo by F. L. Ransome).

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Clayton Valley Salt Flat, from Mineral Ridge, near Silver Peak, Esmeralda County, Nevada, 1896 (photo by C. D. Walcott).

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Lower Left: Personnel in publication and map distribution, Hooe Building, ca. 1917 (photographer unknown).
Lower Right: Pressroom personnel and presses, Adams Building, ca. 1917 (photographer unknown).
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Lower Left: Grooves and striations in glaciated ledge on the crest of the southeast slope of buried preglacial valley of the Nashua River, Marlboro quadrangle, Worcester County, Massachusetts, 1906 (photo by W. C. Alden).
Lower Right: Pitted terminal moraine topography, from the top of Black Hawk Bluff, 2 miles northeast of Prairie du Sac, Columbia County, Wisconsin, 1907 (photo by W. C. Alden).

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Lower Right: Loading logs on railroad car, Olympic Forest Reserve, Washington, ca. 1898 (photo by T. F. Rixon).

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Panorama of Cascade Range from north to southwest, from summit of Mount Hawkins, Snoqualmie quadrangle, Kittitas County, Washington, date unknown (photo by Bailey Willis).

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Oilfield in southern California, date unknown (photo by J. P. Lippincott).

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Left: Oil shales in the Green River Formation (Eocene), northeast of Watson, Dragon quadrangle, Uintah County, Utah 1915 (photo by D. E. Winchester).
Right: U.S. Geological Survey geologists trench sampling part of the outcrop in the left photo, 1915 (photo by D. E. Winchester).

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Lower Left: U.S. Geological Survey field vehicle used in the reconnaissance of the Papago country, southwest Arizona, 1920 (photo by L. R. Freeman).
Lower Right: Launching boats at the last camp, above Hance Trail, Colorado River, Grand Canyon National Park, Coconino County, Arizona, during the Birdseye Expedition, 1923 (photo by L. R. Freeman).

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Personnel of the U.S. Geological Survey’s Accounts Division, 1926 (photographer unknown).

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Upper Right: Truck-mounted current meter and sounding weight, on bridge over Mississippi River at Memphis, Tennessee, 1938 (photographer unknown).
Lower Right: O. H. Jeffers using reel and sled-mounted equipment to measure discharge through the ice of the Mississippi River at St. Paul, Minnesota, ca. 1940 (photographer unknown).

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Upper Right: G. M. Schwartz operating resistivity apparatus, locality and date unknown (photo by A. N. Sayre).
Lower Left: Northwest corner of Klondike Mine, near McIntyre, Wilkinson County, Georgia, ca. 1942 (photo by W. T. B. Lang).
Lower Right: C. B. Hunt (left) and K. E. Lohman (right), Military Geology Unit, U.S. Geological Survey, opening soil sample from the southwest Pacific, ca. 1945 (photographer unknown).

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Monument Valley, with Oljeto Wash in the foreground and one of the Mittens and Mitchell Butte at right center, Navajo County, Arizona, ca. 1952 (photo by I. J. Witkind).

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Dean Edson using an experimental Twinplex stereoscopic plotting instrument to build up map information from pairs of aerial photographs, Sacramento, California, ca. 1960 (photo by E. F. Patterson).

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Lower Right: Airborne magnetic survey of the Patuxent River area, Maryland, 1960 (photo by E. F. Patterson).

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Left: Outcrop of Dakota Sandstone, of Cretaceous age, above Crater Lake Base Camp, Philmont Scout Ranch area, Tooth of Time quadrangle, Colfax County, New Mexico, 1958 (photo by J. R. Stacy).
Upper Right: G. D. Robinson examining an outcrop of the Chinle Formation (Triassic), Cimarroncito Creek, Philmont Scout Ranch, Colfax County, New Mexico, 1958 (photo by E. F. Patterson).
Lower Right: Measuring dip of Dakota Sandstone above Crater Lake Base Camp, Philmont Scout Ranch area, Tooth of Time quadrangle, Colfax County, New Mexico, 1958 (photo by J. R. Stacy).

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Sampling gases of freshly extruded lava from Kilauea Volcano, Hawaii, 1974 (photo by R. T. Holcomb).

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Pyramid Mountain and west wall of Beacon Dry Valley, Taylor Glacier region, Victoria Land, Antarctica, 1958 (photo by P. T. Hayes).

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Sand dunes in the Ubari Sand Sea, between Brach and Ubari, Fezzan district, southwest Libya, ca. 1958 (photo by G. H. Goudarzi).

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Upper Left: Persian water wheel, Indus Plains, Pakistan, ca. 1967 (photo by F. E. Clarke).
Upper Right: Persian water well, Pakistan, ca. 1963 (photo by J. W. Hood).
Lower Left: Excavating salt at La‘ladin Salt Dome, Aden Protectorate (South Yemen), Arabian Peninsula, ca. 1961 (photo by J. E. G. W. Greenwood).
Lower Right: Hauling chrome ore to Campo Formoso, Bahia, Brazil, 1941 (photo by W. D. Johnston, Jr.).

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Landslide scars, near Franklin D. Roosevelt Lake, just south of the mouth of Sherman Creek, Ferry County, Washington, 1953 (photo by F. O. Jones).

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Upper Left: Collapse of Fourth Avenue near C Street, Anchorage, Alaska, after earthquake, 1964 (photo by U.S. Army Corps of Engineers).
Upper Right: Wreckage of Government Hill School, Anchorage, Alaska, as viewed looking west from playground, 1964 (photo by U.S. Army Corps of Engineers).
Lower Left: Numerous vessels washed ashore into the heart of Kodiak, Alaska, by tsunamis following earthquake, 1964 (photo by U.S. Army Corps of Engineers).
Lower Right: Landslide damage in Turnagain Heights area, Anchorage, Alaska, following earthquake, 1964 (photo by U.S. Army Corps of Engineers).

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Depth-integrating sediment sampler attached to a wading rod, locality unknown, ca. 1955 (photo by B. R. Colby).

Page 45.
Rubber raft used in a resurvey of the Colorado River, in Marble Canyon, near the mouth of Little Nankoweap Creek, Coconino County, Arizona, 1968 (photo by H. G. Stephens).
Earth science information and data are essential to balance the wise use and conservation of our lands, energy, mineral, and water resources, and to maintain and improve environmental quality during the next century.
As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.