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Introduction

The United States Geological Survey was established by an Act of Congress on March 3, 1879 to consolidate four earlier organizations that had been engaged in topographic and geological mapping and in collecting information about public lands.

THIS IS A BIRTHDAY PARTY. That's the reason for the balloons. Those of you who have balloons, blow them up. I've had the speakers since early this morning blowing up some of the balloons you see around here; you know they haven't lost all their hot air but I guess they've lost some of it, so we should have a good program.

This is the 100th birthday of the USGS and we're certainly happy to have you all here. We think we have an interesting program for you.

Unfortunately, our two hosts, the Director of the Survey, Bill Menard, and the Chief of the Topographic Division, Rupe Southard, have been summoned to something called a Senate hearing, so we're hoping that there is a tomorrow for the GS. At the moment they're up on the hill in conference with the Senatorial committees and even though they are not here they send their fond regards.

I have been greatly concerned as to the reason for my selection as the monitor of this distinguished portion of this year's Annual Meeting. I concluded that I must be the victim of one of two chains of thought. One, I am probably the oldest private practitioner who is still looking for a USGS contract. Or two, perhaps someone may feel that I hold a grudge against the Survey and that I should be placated. Now I have dismissed the second reason because the ones that are really upset with the GS are the ones that have the contracts. So I'm forced to accept my first suspicion, namely that my age and long-time friendship with the members of the Geological Survey do have their proper purpose, and I am very pleased and honored to be the moderator of this historic recognition of a century of progress in USGS mapping.

I feel somewhat like the man who was condemned to die and was waiting execution. The prison priest came and after administering some of the preliminaries he said to this young fellow, "Repeat after me, I renounce the devil and all his evil deeds." But the guy said nothing. So the priest said again, "Say after me, I renounce the devil and all his evil deeds." The fellow didn't say anything. Finally, the priest went over and bent over him and said "Didn't you hear what I said?" The fellow looked up and he said, "Yes, Father, I heard what you said. I know that I am condemned and that I'm going to die in a little bit, but I think this is a hell of a time to antagonize anybody."

In 1976, I delivered the Opening Address to this convention with a talk entitled "Two Centuries of Service." It's easy to see that in three years I gained 100 years and next year I expect to be projecting mapping forward into the year 2080.

We can approach this centennial celebration only through a sense of history and accomplishments. Why did Congress in its wisdom create the Geological Survey and

* Mr. Quinn was moderator for the ASP/ACSM Joint Plenary Session, "A Century of Progress in USGS Mapping," held on March 22, 1979 during the Annual ASP-ACSM Annual Convention in Washington, D.C. This Introduction, and the seven papers presented at the Plenary Session, are included in this issue of the Journal.

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why has this agency of our government existed for 100 years? The Geological Survey has selected a member of its staff, Mrs. Mary C. Rabbit, to document the history and development of the Survey's work. This study will be published in four volumes. Volume 1 describes in thrilling detail the events leading to the creation of the Survey prior to 1879. Volume 1, entitled *Materials, Lands and Geology for the Common Defense and Welfare*, is available and I strongly believe that you will enjoy reading it. The following is a brief recounting of the historical events leading to the establishment of the Survey.

The history of the Geological Survey parallels the development and growth of our country during the 19th century. As the settlers from the east turned towards the west, there was an unprecedented need for exploration and scientific investigation of our natural resources. Early western expeditions returned to the east with fabulous stories about vast areas to be conquered and developed.

Active and important research began for American geology in the 1830's and the 1840's in the State surveys of New York and Pennsylvania. Later, and particularly after the War of 1865, the trans-Mississippi west was explored, and the evaluation of our western domain began. Three outstanding geologists who were later a part of the origins of the Geological Survey were Clarence King, who became the first Director, John Wesley Powell, the second Director, and F. V. Hayden. These men raised the science of geology to new levels of accomplishment and independence within the Federal Government and thus prepared the way for the Geological Survey.

King proposed and in 1867 received a Congressional appropriation for further exploration and surveys in the west as a part of the Army Corps of Engineers under General Andrew Atkins Humphries, the Chief of the Corps. In 1872, King and his men were instrumental in unmasking a dramatic diamond fraud in which clever thieves seeded an area and able geologists were fooled into declaring the mine to be a genuine diamond mine. King discovered and exposed this fraud and gained for himself and the Government the grateful thanks of the public. Later, King severed his connection with the Corps of Engineers.

In 1867, F. V. Hayden became associated with the Department of the Interior. Hayden received a doctor of medicine degree from the Albany, New York Medical College and, except for service as a doctor in the Civil War, he devoted his time to the collection of fossils and rocks and work with geologists in the upper Missouri River areas. His reports and studies provided a valuable background for the west (Figure 1). He was an active leader in the establishment of Yellowstone National Park in 1872.

FIG. 1. Members of the Hayden Expedition. (Photo by W. H. Jackson, 1871.)

John Wesley Powell was born in upstate New York but spent most of his early life in the middle west. Although he attended several colleges, he never received a degree. After the Civil War he was on the faculties of Illinois Western and Illinois Normal Universities. A one-armed veteran of the Civil War, Major Powell explored the Colorado River region (Figures 2 and 3). His surveys laid the foundation for a new division of Earth science—the American school of geology.

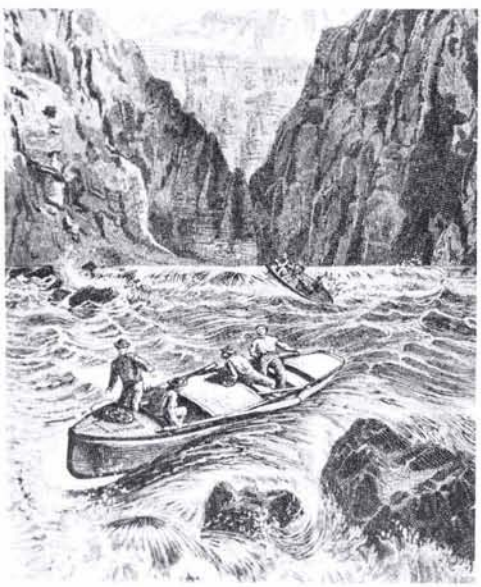

FIG. 2. Running a rapid. (Line drawing from *Canyons of the Colorado* by J. W. Powell, 1875.)

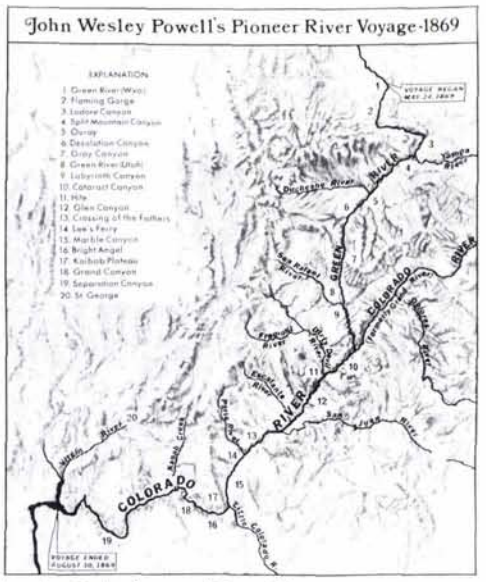

FIG. 3. Relief map of Powell's pioneer river voyage in 1869.

He acquired an interest in land reclamation which he expanded into a national program during his tenure as Director of the Geological Survey.

The movement for a united geological survey was a reaction to an intersurvey rivalry which brought disorder to government science, reduced public confidence in it, and even threatened its extinction. Hayden and Powell clashed with the Corps of Engineers who, after King had left them, established their own survey under Lt. George M. Wheeler.

An important factor that preceded the founding of the USGS was the resumption by the Army Corps of Engineers of topographical mapping of the western territories. In 1873, General Humphrey promised an atlas of 95 sheets west of the 100th meridan. Fifty sheets were prepared and published by surveys under the command of Lt. Wheeler, who was a graduate of West Point.

Wheeler's maps of the southwest were better than those of any other Army engineer. In one of his reports he stated "Topography has grown up as a permanent, unvarying essential of the military profession, and in all large, well organized governments, it is now under military administration and everywhere, without exception, military officers alone are eligible to the direction and control of such work." Needless to say, a clash with Hayden and his nonmilitary surveys was inevitable.

A bitter struggle ensued between military and civil scientists which erupted in Congress. A reaction developed and influential members of Congress began investigations and demanded economy. (That sounds like today, doesn't it?) The desire to arrest this political deterioration and to stabilize government science led to the movement for a united geological survey. Further studies and debates in the National Academy of Sciences led to the eventual passage of a civil bill signed by President Hayes which created the Geological Survey on March 3, 1879. King and Hayden sparred for the position of Director. On March 21 the President sent the name of King to the Senate and on April 3, he became the first Director.

When the Geological Survey was created in 1879, its function was to furnish closer coordination between government agencies assigned the job of classifying the public lands and "the examination of geologic structures, mineral resources, and products of the national domain." It was to supersede all of the earlier geological and geographical surveys. Limited at first to the land west of the 100th meridian, the field of the Geological Survey eventually extended over the entire country.

The project of a national topographic map was the most surprising consequence of the Survey's expansion in 1882. During Clarence King's directorship the science of topographic mapping was virtually ignored. The new Director in 1882, John Wesley Powell, established a topographical division and secured Congressional consent for the Survey to move eastward. Within 12 years the Survey entered every State and territory and mapped 600,000 square miles. Henry Gannett was Chief of the Division and was aided by A. H. Thompson and J. H. Renshawe. These men along with Gilbert Thompson, H. M. Wilson, and others, formed the backbone of the mapping organization, and their names appear on many of the old USGS quadrangle sheets.

While the Survey's maps drew professional admiration from American and European engineers, they were also criticized for errors and omissions. Powell's desire to complete the national mapping in one generation forced topographers to move at a pace which undermined their craftsmanship. A particular critic, W. D. Johnson, seriously challenged the Survey's work and this eventually led to better mapping and the establishment of the one-mile-to-the-inch standard topographical map sheets.

The speakers on our program will document further the accomplishments of the mapping of the U.S. Geological Survey.