

## *CAPTAIN OLIVER SCOTT READING AND HIS ROLE IN PHOTOGRAMMETRY*

Captain Oliver Scott Reading was a mechanical genius. In the early 1930's he led teams of engineers that designed nine-lens photogrammetric camera; the 34-ton, 50-inch camera used for the exact duplication, scale reduction, and expansion of the various plates used by the Coast and Geodetic Survey in the production of nautical charts; an automatic projection ruling machine; and many other instruments for use in precision chart and map production. In this particular realm, Reading was following a path well-trod by the great instrument makers of the Coast Survey including such men as Joseph Saxton, William Wurdemann, and George Mathiot.

One of Reading's first recorded incursions into the realm of mechanical engineering within the C&GS did not lead to expectations of future greatness within the realm of photogrammetry. One of his first inventions was a spring-mounted drafting table for dampening engine vibrations in a survey launch. Captain Carl Aslakson described this Rube Goldberg affair in his memoirs:

"Scott Reading fancied himself as an inventor and gadgeteer. Our sounding launch vibrated badly and, as I was taking the right sextant angle to the shore signals during launch hydrography and plotting them with a three armed protractor, I had much trouble because of the vibration. One morning Scott got up early and did something out in the launch which he thought would solve the problem.

"When we reached our sounding area and I started to plot on the drafting table, I got a surprise. The table sank down when I started to plot. When I removed the weight of my arms from it, it sprang up and hit my chin. That morning Scott had put four bed springs under the plotting board. I got through that day with great difficulty. The next morning I was the one up early. I proceeded to tear out Scott's bed springs and throw them overboard. I preferred the vibration to being knocked out by the plotting board."

After this first abortive attempt, Captain Reading proved himself to be quite an "inventor and gadgeteer." Fortunately for photogrammetry, he was assigned to conduct control surveys and field inspection of aerial photographs for the compilation of planimetric maps along the coast of Florida in 1930. Following that assignment he became head of C&GS photogrammetric and to some extent photographic operations for the duration of his career. The first task that he embarked on was the design and installation of the 50-inch precision copying camera referred to above. While working on the 50-inch camera project he also was involved with designing and installing an automated projection ruling machine, forerunner of today's automated plotters.

In 1933 Reading began work on the invention for which both he and the Coast and Geodetic Survey attained the most fame. Because of the relatively small areas covered by the 5-lense and single lens cameras then in use for photogrammetry, Reading next designed a nine-lens photogrammetric camera that was constructed by Fairchild Instrument Corporation. This camera broke new ground for the Coast and Geodetic Survey and it might be added for the new engineering discipline of photogrammetry as it was capable of covering an unprecedented 130 square miles per exposure with a very high level of detail. Never one content to rest on his

laurels, Captain Reading was also working on a rectifying camera, a transforming printer, and a stereoscopic plotting machine concurrently with the nine-lens camera work. This extraordinary explosion of personal creativity took place at a time in his life when most men have started losing their technical creativity and begun migrating towards management positions. It is all the more extraordinary because Reading only had a high school education [He graduated from Chicago's Lane Technical High School in 1912 and entered on duty with the C&GS in 1915. His first fifteen years in the Survey were exclusively shipboard.] while the remainder of his education "consisted of studies arranged by himself."

Given Captain Reading's enthusiasm and energy, it is not surprising that the first two meetings of the American Society of Photogrammetry [today known as the American Society of Photogrammetry and Remote Sensing] were held at his home. The first editorial in Volume I, Number 1, page 1 of Photogrammetric Engineering was written by Reading and titled "Proposed Activities of the American Society of Photogrammetry." Reading introduced this article in the following words:

"Any one listening to discussion of the relative merits of single lens and multi-lens photographs, of focal plane versus between-the-lens shutters, of plotting machines versus photographs combined with plane table, will be impressed with the resemblance of the present state of photogrammetry in this country to the fable of the three blind men examining an elephant. As I remember the story, one blind man felt the trunk, another the legs, and a third the tail. Each thought the other very stupid and very much mistaken as to the character of the animal. In much the same manner, each one of us has had more or less limited experience with different types of photographs and has compiled different types of maps from them, but few of us are experts in all branches of the art. Each has much to gain from listening to the ideas and experiences of other for we are all feeling our way rather blindly around the tremendous new possibilities of mapping from aerial photographs.

"It is planned that the activities of the American Society of Photogrammetry will serve to unify and make effective the present scattered hopes, aspirations, ideals, knowledge, and experience of members...."

The first year of the society saw Reading as Second Vice President, the second year he was first Vice President, and the third year he was President. In late 1937, Otis Reading, having finished his tenure as the third President, commented on an experience that he had the previous year:

"Now it is particularly fortunate for a country so large as the United States that a new method - air photographic surveying - has been developed which reduces to about one-half the cost and time required for adequate maps. Last summer I sat operating the nine lens camera of the Coast and Geodetic Survey as we flew along at 160 miles an hour in an Army Air Corps bomber three miles above the earth's surface. All I had to do was to watch the sight and levels while about every minute and forty seconds the shutters clicked and a fresh bit of film was automatically wound up. In an 80th of a second the light reflected from the earth below had recorded on film every meander of coast and stream, every road, every building, every field and detail of importance in more than 120 square miles of terrain. We finished photographing the

1,400 square miles in which we were interested with every detail photographed on 1:20,000 scale with plenty of overlap in an hour and flew back to Washington. The combined work and ingenuity of more than two hundred individuals had gone into the development of that camera and no one knows how many into devising and perfecting the film and the airplane....”

This first operational mission of the nine-lens camera was flown over the shoreline of much of Upper Chesapeake Bay. The nine-lens camera was used for over thirty years and photographed hundred's of thousands of square miles of United States territory. The camera was so tough that it survived a crash on Mount Moffat in the Aleutian Islands of a Coast Guard aircraft in which it was mounted during WWII. Captain Oliver Scott Reading's legacy is one of continuing innovation in the field of photogrammetry and the tremendous amount of geographic knowledge that has been gained by the thousands of photogrammetrists that have been joined by the organization that he was so instrumental in helping found and organize.