

When the "Vulcan" was being built, Wilson was severely ridiculed by the craftsmen on the canal—which ran close to his yard—who, when passing, would drop small pieces of iron into the water and sarcastically inquire if he expected his boat to "solum." And as soon as it became known in the neighborhood that an iron boat was being built, the villagers came down to the yard and gazed open-mouthed at the phenomenon. In a short time deputations of the skeptically inclined began to intercept the builder on his way home and endeavor to point out the foolishness of the undertaking. When the "Vulcan" was nearing completion, Wilson was one morning surprised to find them coming down to the water's edge with pots and pans to try their buoyancy and once and for all convince themselves that iron would float.

After the boat was launched she proved so great a success that the representatives of the Forth and Clyde Company commissioned Wilson to build several other similar barges for their cargo and passenger traffic.

The "Vulcan," passing ultimately into other owners' hands, was broken up after being in use over sixty years. It is said she could have continued to do good service for many more years, so remarkably sound had she been built, but she was considered obsolete for trading purposes, having been superseded by more modern boats. Shortly after the "Vulcan" was launched Wilson accepted a post in the Forth and Clyde Canal Company, and for fifty years served them in the capacity of chief engineer, retiring on a handsome pension, which he lived to enjoy for many years. He died at his residence, Zetland Place, Grangemouth, on November 1, 1873, at the advanced age of 92.

CLARENCE KING.

BY MARCUS BENJAMIN, PH.D.

Clarence King was born in Newport, R. I., January 6, 1842. His boyhood was passed in Newport, and as he grew older the long summer vacations were spent in camping out with youthful associates among the Green Mountains, where he led an open-air life of hunting and fishing, and at the same time absorbed a knowledge of natural history and botany.

His early fondness for natural history seems to have marked a decided predilection for scientific studies, and accordingly he entered the Sheffield Scientific School of Yale University, where he was graduated in 1862.

A year later, with James T. Gardiner, a college associate, he crossed the continent, traveling on horseback from the Missouri River to California, making careful geological observations during the journey. On reaching the Pacific slope he met Josiah D. Whitney, the eminent geologist, who was then conducting a survey of California; and accepting an appointment with that work, he continued with the survey until 1866. Of special interest were his paleontological studies, which furnished evidences on which rest the determination of the age of the gold-bearing rocks. It was at this time that he discovered and named Mount Whitney and Mount Tyndall, and on climbing these peaks found them to be the highest group discovered in California.

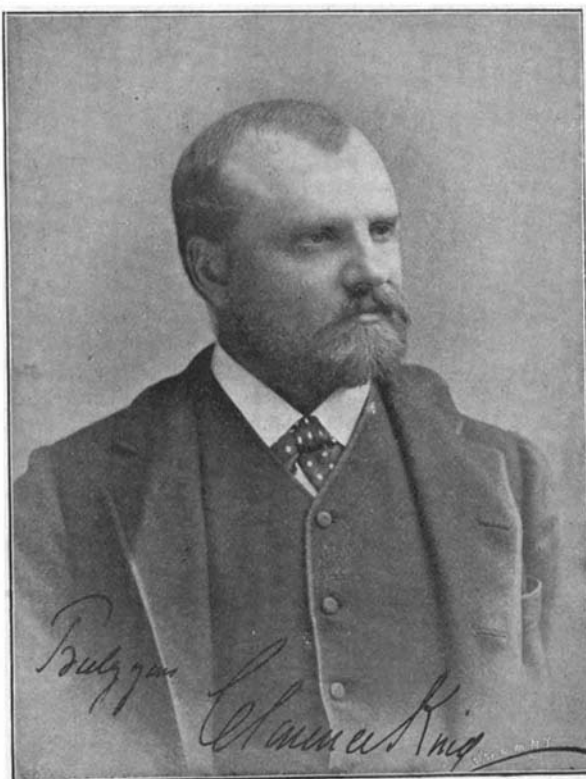
He returned to the East in the autumn of 1866, and then originated an elaborate plan for the complete geological section of the western Cordillera system at its widest expansion of the fortieth parallel. The Chief of Engineers and Secretary of War sanctioned the plan, and the necessary legislation in Congress was secured by the personal labors of Mr. King, who, early in 1867, was appointed to the charge of the survey.

Accompanied by a large and able staff of his own selection, and wholly civilian, he took the field in 1867, and for five years prosecuted the work in accordance with the original plans and instructions. It is impossible to describe the work which he did in any detail, but it has been admirably summarized as "a signal contribution to the material of science, establishing standards and methods of the highest order for the Geological Survey of the United States which followed in natural sequence."

Meanwhile an occurrence of unusual interest happened in which, fortunately, he took part. Early in 1872 much attention was called in this country and in Europe to the alleged discovery, somewhere in the far West, of new diamond fields of unparalleled richness. Large quantities of precious stones had been brought thence and judged by experts to have great value. Reports which received the confidence of capitalists were made in New York and San Francisco, setting forth the great importance of the new find, and resulted in the formation of several companies to exploit the field. As it afterward appeared, many thousands of dollars' worth of rough diamonds, rubies, emeralds, and other gems had been purchased in London, brought to the chosen locality and sown with a free hand on the ground or carefully stuck into anthills. Much excitement prevailed, and there can be

but little doubt that, if the swindle had remained unexposed for a short while longer, there would have been a rush to the supposed sources of wealth like that which followed the discovery of gold in California. The precise locality was kept secret for some months, and the impression prevailed that the diamond fields were in Arizona. The discovery that they were within the official limits of the Fortieth Parallel Survey was fortunately made by one of Mr. King's staff, and he immediately set out for the designated locality. The swindle had been skillfully prepared, even to the choice of a locality geologically favorable, and the "salting" had been so cunningly and artfully done that it had already deceived honest experts of much experience; but on the second day after his arrival Mr. King's suspicions were aroused, and he at once began a series of careful observations from which it clearly appeared that the gems were found in positions where nature alone could never have placed them, and were not to be found in places where, had the occurrence been genuine, the inevitable laws of nature must have carried them; that near every anthill found to contain gems might still be seen the storm-worn footprints of mankind, while anthills free from human tracks were also void of precious stones; and, finally and unquestionably, that some designing hand had "salted" the fields with deliberate and fraudulent intent. The public announcement of this result was followed by the immediate bursting of the bubble; but had this been delayed only a little while, it is certain that great disappointment, distress, and loss of money would have been suffered by many victims of the fraud.

In 1878 the various known surveys then in the field,



THE LATE CLARENCE KING.

organized under different departments of the government, were consolidated into the United States Geological Survey under the direction of the Secretary of the Interior, and the Directorship was offered to Mr. King by President Hayes. He accepted the office with the distinct understanding that he should remain only long enough to appoint its staff, organize its work, and guide its force into full activity, and, accordingly, in 1881, he withdrew from active work in order to devote himself to special geological investigations.

During the course of his labors on the geology of the western part of the United States, conclusions that the problem of the action of the forces that built the mountains of the continents had not been studied with sufficient closeness forced themselves upon him. He therefore undertook a series of laboratory experiments to determine the action of the primal constituents of the early globe under conditions of heat and pressure assumed to exist when the material of the earth was separated from the sun. The chemical and physical work required by these experiments was very expensive, and had not been completed at the time of Mr. King's death.

Mr. King was a member of many scientific societies both in this country and abroad, and in 1876 was chosen a member of the National Academy of Sciences. He was a contributor to magazines and reviews and was the author of "Mountaineering in the Sierra Nevada" (Boston, 1871), an admirable book of travel which describes his life as an explorer in the unknown heights of the greatest of our American ranges.

In recent years his health steadily failed, especially since the early winter of 1893, when he was for a time a sufferer from a mental difficulty, and during the cold months of the present winter he sought relief for pulmonary troubles in the dry climate of Arizona.

He was in Phoenix when the end came, and died there on December 24.

SCIENCE NOTES.

Mr. F. Bowden, president of the Cycle and Motor Trades Association, England, states that the cycle trade gives employment to over 100,000 people in that country, and is the means of distributing an enormous sum per week in wages. The average profit per bicycle made by the manufacturing companies during 1900 amounted to only \$2.16.

Acetylene gas lamps are being introduced into the omnibuses of London, in place of the disagreeable oil lamps which have hitherto been used. By this means the interior of the vehicle will be illumined by a bright white light. Contracts for 2,000 acetylene gas lamps for this purpose have been placed with the Phos Company by the various omnibus companies, and the work of installing them upon the vehicles is proceeding rapidly.

The most ambitious attempt to navigate the air ever made, in the matter of expense certainly, is that of Count Zeppelin's dirigible balloon, familiar to our readers by illustrated articles. It is asserted in foreign exchanges that the shed at Lake Constance which contained it has been demolished and all employes dismissed; no more money being forthcoming to prosecute experiments, the air vessel itself will probably be broken up.

Statistics carefully compiled show that 9,000 persons went to Nome this season, and that 10,200 have returned or are returning, leaving about 4,000 in the district for the winter. There were 80 vessels, steam and sail, engaged in the Nome traffic, carrying from Seattle 55,000 tons of general freight. The estimated receipts for the transportation of freight and passengers are \$1,874,000, and the value of the freight shipped from Seattle \$5,500,000. About \$4,500,000 gold has been shipped from Nome this season.

The French Minister of Public Works has issued a decree prohibiting the railroad systems of France from working their men more than twelve hours out of twenty-four. Signalmen, switch tenders, trackmen and watchmen at duty on grade crossings must have an uninterrupted break for at least eight or nine hours. One hour is to be allowed in the middle of the day for meals, and each is to have one day or two half-days a month free, and employes are forbidden to work more than two months consecutively without taking at least one day's vacation. The railroad companies have ninety days in which to arrange for the practical working of the new decree.

In striking contrast with the financial failure of the recent Buffalo Exhibition, is the unqualified success that has attended the International Exhibition at Glasgow, Scotland. During the seven months it was open 11,496,220 people passed through the gates—double the number that attended the exhibition of 1888. The last day was the most successful, the attendance numbering 173,266. The total receipts of the former exhibition were \$566,330, and a surplus of some \$200,000 resulted. The total receipts from the recent exhibition amount to approximately \$850,000, and it is anticipated that the profits will amount to \$400,000. Over 100,000 season tickets alone were disposed of. The only expressed dissatisfaction of a serious character was the absence of side shows—entertainments of the lighter character. As a digest of the industrial world, and particularly of Scotland, the exhibition has been generally regarded, if not the largest, as the most varied and representative exposition of the kind ever held.

Although Württemberg is only a small state of little more than 2,000,000 inhabitants, and a revenue of less than \$20,000,000, it possesses one of the best controlled and thoroughly efficient systems of scientific education in the world. At Tübingen there is a State University, which has long been formed. Not only does it give the highest education, but does so cheaply. Below the university are a technical high school and a Royal building trades school, both at Stuttgart. At Rentlingen is a textile technical school; at Schwenningen a school of mechanical industries. In other centers are three weaving schools, two weaving workshops, and a knitting school. In addition to these provisions there are 231 towns and villages provided with industrial improvement schools, the subjects being adapted to local exigencies. To spread the influence of this teaching, industrial courses of lectures and demonstrations are given wherever required in such subjects as boot-making, metal-making, joinery, painting, braziers' work, etc. Women are not neglected. Eighteen improvement schools are provided, as well as a commercial college at Stuttgart, and two commercial improvement schools. All these institutions are replete with the most modern apparatus, etc., to insure sound teaching. The system is so excellent that foreign students are seeking to avail themselves of its advantages to such a considerable extent, that the authorities have had to impose special heavier conditions for foreigners.