

ART. VII.—JAMES CRAIG WATSON.

JAMES CRAIG WATSON, Professor of Astronomy in the University of Wisconsin, and Director of the Washburne Observatory at Madison, Wis., died on the morning of Nov. 23, 1880, after an illness of one week, at the age of forty-two years and ten months. Professor Watson was one of the most gifted and distinguished of modern astronomers, and his life-work is identified with the name of the University of Michigan.

He was born of American parentage, during a sojourn of his parents in Middlesex (now Elgin) County, Ontario, January 28, 1838. The mathematical genius revealed by the boy at the early age of nine, determined the father to secure him a liberal education; and the family accordingly removed to Ann Arbor, in 1850. Here James displayed equal aptitude for mathematical and linguistic studies, and being prepared for college, almost without the evidences of effort, he entered the University of Michigan in the autumn of 1853. He attained equal scholarly distinction as a student of ancient and modern languages, and of mathematics. It is said that before the close of his Junior year, he had performed the phenomenal feat of reading from beginning to end the *Mécanique Céleste* of Laplace. During his Senior year, he was the solitary pupil of Dr. Brünnow, and graduated in 1857. His mechanical tact was such that in the absence of a mathematical bent he would have become an eminent mechanic and inventor. While in college, some of his spare hours were spent in grinding lenses and the construction of a telescope. Other portions of his time he was compelled to devote to the earning of means to defray collegiate expenses.

During the two years succeeding his graduation, he was employed as assistant in the Observatory, and in the prosecution of studies for his second degree. In this work he displayed such remarkable aptitude as an observer, and such marvelous rapidity in his computations that, on the retirement of Dr. Brünnow, in June, 1859, young Watson succeeded him in the chair of Astronomy. He was already known as a frequent contributor to the *American Journal of Science*, Brünnow's *Astronomical Notices*, Gould's *Astronomical Journal*, and the *Astronomische Nachrichten* of Altona. Not less than twelve communications written before he was twenty-one are recorded in the Royal Society's Catalogue of Scientific Papers, which also enumerates twenty-one others between 1859 and 1874. His wonderful keenness as an observer was signalized, while yet an undergraduate, by the discovery of a comet on the 29th day of April, 1856, and four months after graduation, by the

discovery of a planet on the 20th of October, 1857, which, however, proved to have been observed by Luther a few days before, and has been named *Aglaia*. His observations of Donati's comet, in 1858, possess a standard value, and his computation of the orbit is recognized as authoritative. The interest awakened by this comet prompted to the preparation of "A Popular Treatise on Comets," published early in 1860.

In 1860, Dr. Brünnow resumed the directorship of the observatory, and young Watson was assigned to the chair of Physics in the University, which he retained for three years, when, on the final retirement of Dr. Brünnow, Watson was made Professor of Astronomy and Director of the observatory—a position which he held and honored for sixteen years. Scarcely had he been clothed with full control of the instruments when he resumed his remarkable career of discovery. There seemed almost a magic in his powers. Unrecognized celestial objects seemed to crowd spontaneously upon his notice. On September 14, 1863, he made his first independent planetary discovery. This was *Eurynome*. On January 9, 1864, he discovered the comet since known as 1863, VI, which Respighi, as it proved, had already noted. On the 9th of October, 1865, he discovered a planet which also proved to have been announced by Peters, and has since been named *Io*. He discovered *Minerva*, August 24, and *Aurora*, September 6, 1867. During 1868, he added no less than six minor plants to the solar system, furnishing the only instance in which the list of planetary discoverers presents the same name four times in immediate succession.

Meantime he was engaged upon a work which might well have engrossed all his powers, and must have quite exceeded the abilities of any but a gifted mathematical genius. It was no less than a complete digest of the results and methods of all the great writers on theoretical astronomy, and an independent development of the great principles of the science. "Having carefully read the works of the great masters," he says in his preface, "my plan was to prepare a complete work on the subject, commencing with the fundamental principles of dynamics, and systematically treating, from one point of view, all the problems presented." This broad plan, conceived by a young man of twenty-eight, and completed when twenty-nine, was executed with ability so commanding, that the work, on its appearance, in 1869, was immediately accepted as an authoritative exposition of the higher principles and processes of dynamical astronomy, and was made a text-book at Leipzig, at Paris and at Greenwich. The same year he was sent by the General Government on an expedition to observe the solar eclipse at Mt. Pleasant, Iowa; and in 1870, to Carlentini, Sicily, for a similar purpose. In 1874 he was appointed to the

charge of an expedition to Peking, China, to observe the transit of Venus. His observations were favored by the weather and conducted with consummate skill. The results, though reduced and discussed, are not yet published. Even at the antipodes, fresh discoveries awaited him. He had already raised his list of planetary discoveries to seventeen, and now added *Juewa*, the eighteenth. In 1876, he was one of the Judges of Awards at the Centennial Exposition, and wrote the celebrated "Report on Horological Instruments." In 1878 also appeared his *Tables for the Calculation of Simple and Compound Interest*—a work which, in spite of the subject, is marked by great originality, and demanded a vast amount of wearisome labor. The same year he was sent by the General Government in charge of an expedition to Wyoming, to observe the total solar eclipse. Professor Watson, having long entertained a belief in the existence of an intra-mercurial planet, as well as of an extra-neptunian one, gave special attention, at this time, to a search for the former, and was the first astronomer to note certainly (July 29, 1878) the existence and position of the planet Vulcan. He also satisfied himself of the existence of a second intra-mercurial planet. This brought the number of his original planetary discoveries to twenty-six (including one lost July 29, 1873, and two anticipated). He was now animated by an intense desire to control instruments of suitable power and adjustment to confirm his last observations, and enable him to detect the outlying planet beyond Neptune. Coincidentally came the invitation to assume the charge of the Washburne Observatory at Madison, Wisconsin, which was to be improved and newly equipped with instruments far more efficient than those at Ann Arbor. The temptation was great, but he naturally clung to his Alma Mater, whose authorities made such efforts as they thought authorized to content their astronomer. But the requisite means could only be obtained by a grant from the legislature—a measure defeated by an inadequate appreciation of the honor shed upon the State by such a name as Watson's. Reluctantly, but sustained by a high and noble aspiration, he removed, in the summer of 1879, to Madison, and immediately devoted himself with intense energy to remodeling the observatory structure, and introducing some original provisions thought to be suited to the special researches on which he was bent. A cellar twenty feet deep was sunk at the bottom of the first slope of observatory-hill. Into this, light was to be thrown through a long tube, from powerful reflectors on the top of the hill. This, with other accessory work, was actually in progress, when a severe cold brought on peritonitis, which over-confidence in his physical powers permitted to reach a fatal stage before medical aid was

summoned. His remains, accompanied by an escort from the University of Wisconsin, were removed to Ann Arbor, where they lay in state, in the university, during the 25th of November, and on the following day, with due honors and imposing ceremonies conducted by his late colleagues, were reverently laid beneath the shade of Oakwood Cemetery.

Professor Watson possessed extraordinary intellectual endowments. His quickness of perception nothing escaped. His mathematical intuitions scorned the ordinary processes of calculation, and gave him a masterly command of mathematical logic and formulæ, which made so many portions of his work on Theoretical Astronomy strictly original, and all parts virtually his own. Yet he never mentions any claim to originality, but pursues his majestic intellectual march with the dignity almost of an inspiration. His memory served him equally well. It was both circumstantial and philosophical. Every new observation was immediately illuminated by all which he had previously observed or known, and he saw instantly the proper conclusions. His mechanical gifts gave him perfect command of instruments and their construction, and the Washburne Observatory would have been equipped with several of his inventions. His versatility extended to matters of business. He was for years the Actuary of the Michigan Mutual Life Insurance Company, and performed service pronounced invaluable. He managed his private means with such success that he died possessed of a considerable fortune which his will secures to the National Academy of Science. Physically, he was vigorous and healthy, and reached in the last years of his life, a weight of two hundred and forty pounds. His religious nature held fast to the fundamental religious beliefs. He used to say it is impossible for a mathematician to be an atheist; and his works offer frequent recognition of the being of the supreme Creator and Governor of the Universe.

The world was not slow to recognize his worth. He was elected a member of the National Academy of Science, in 1867, and of the Royal Academy of Sciences in Italy, in 1870. He received the degree of Doctor of Philosophy from the University of Leipzig, in 1870; and the French Academy of Sciences conferred upon him the Lalande gold medal for the discovery of six new planets in one year. Yale College honored him with the degree of Doctor of Philosophy, in 1871. In 1875, the Khedive made him Knight Commander of the Imperial Order of Medjidich of Turkey and Egypt. He was elected member of the American Philosophical Society in 1877, and received, the same year, the degree of Doctor of Laws from Columbia College.

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