

November 30th last, made at Nuremberg appeared in V. 16 (1696) of the *Philosophical transactions* of the Royal Society. His contributions occupy 50 folio volumes.

COLLABORATION WITH DAUGHTER

Eimmart had the rare good fortune of having an intimate collaborator in his own daughter Maria-Clara Eimmart (1676–1707). Besides helping her father in the compilation of several astronomical tables, Maria-Clara helped him in making 300 drawings of the phases of the moon as seen through the telescope. A further interesting fact is that her husband Henri Muller succeeded Eimmart as the Director of the Observatory at Nuremberg.

Eimmart died at Nuremberg January 5, 1705.

Geddes, James (1763–1838)

JAMES GEDDES, an American Canal Engineer, was born near Carlisle, Pa, July 22, 1763. Till his fortieth year, there was no indication either of engineering interests or engineering talents in him. In 1794, he removed to Syracuse and became one of the pioneers in salt industry. Then he studied law. In 1800 he was made a Justice of the Peace and in 1809 he was appointed Judge of the County Court. He was elected to the Assembly in 1804 and again in 1822. He also served in the Congress from 1813–15.

STIMULATION OF ENGINEERING INTERESTS

In 1804, when he was a member of the Assembly, the Surveyor-General of New York broached to him the possibility of constructing a canal from the Great Lakes to the Hudson River. This kindled his imagination. He personally investigated the subject and started a vehement propaganda for the undertaking. Moreover, though he had no technical training whatever, he himself ran the first survey in 1808. Then he made similar surveys for two other canals including the Erie canal. After the war of 1812, Geddes was engaged by the Canal Commissioners as one of the four principal engineers. His services were requisitioned throughout the Eastern States and by the Federal Government in exploring and designing several canals.

He was thus in active exploration work till his death in August 19, 1838.

Warington, Robert (1838–1907)

ROBERT WARINGTON, a British agricultural chemist, was born in Spitafields August 22, 1838. He is said to have owed his chemical proclivities to his father, Robert Warington who was one of the influential founders of (British) Chemical Society (1841). Young Robert learned his chemistry at his father's laboratory at the Apothecaries' Hall, where his father was obliged to reside as the Chemical Operator of the Society. Life in the heart of London with no exercise undermined his health.

HIS CAREER

Warington was at first an unpaid assistant of Mr. Lawes at the Rothamstead Laboratory (1859) and learned ash analysis. From 1860 to 1862, he worked at South Kensington as research assistant under Dr. Frankland. Another breakdown in health necessitated a change to country life. Accordingly, Warington spent the next five years as a teacher in the Royal Agricultural College at Cirencister. From 1867–76 he was chemist to Lawes' manure factories at Millwall. Then he turned to Rothamstead once again for a short while and finally settled at Harpenden.

HIS CONTRIBUTIONS

Warington was a profuse writer. 63 papers (including 5 joint ones) were published by him between 1863 and 1900. The first paper bore the title *On the Quantitative determination of the phosphoric acid, by salts of magnesia* and appeared in the *Journal of the Chemical Society*. The last paper, which appeared in the *Proceedings* of the same Society was on *Recent researches in nitrification*. One of the most useful of his writings is a little volume entitled the *Chemistry of the farm* (1881). It is a most widely read book on the subject. It reached its 19th edition during his life-time. It was translated into several foreign languages.

NITRIFICATION

Speaking generally, Warington's work consisted largely of examining and perfecting methods of analysis for use in agricultural chemistry. Most of the methods of analysis elaborated by him have been accepted as standard methods. But his fame rests mostly in his contributions to nitrification. This subject engaged him from 1877 to 1891. His first paper on the subject was entitled *On Nitrification*, and was published (1877) in

Vol. 33 of the *Journal* of the Chemical Society and in Vol. 94 of the *Annales de Chemie*. Warington confirmed the biological nature of nitrification not only in soil but also in ammoniacal solutions inoculated with soil. He showed also that the nitrous organisms were entirely confined to the first nine inches of ordinary soil (1887). He further showed that the nitrification of organic nitrogenous substances (urine, milk) has to be preceded first

by their transformation into ammonia. Warington was one of the first to demonstrate that an approximate increase of 350 pounds of nitrogen per acre may be obtained as a result of the growth of inoculated legumes.

In 1906, Warington's health gave way. He had to undergo a serious operation. He never regained his health after this and he passed away, March 20, 1907.

ASTRONOMICAL NOTES.

Planets during September 1938.—Mercury will be a morning star during the month and will be visible low down near the eastern horizon for a short while before sunrise. There will be two conjunctions of the planet with Mars, one on September 4 and the other, a very close one, on September 16. Venus will continue to be a very conspicuous object in the western sky; it reaches greatest eastern elongation ($46^{\circ} \cdot 3$) on September 11 and can be seen in our latitudes for nearly three hours after sunset. Mars is slowly moving away from the sun but is still not favourably placed for observation. On September 5, the planet will closely approach the first magnitude star Regulus (α Leonis).

Jupiter will be on the meridian at about 10 p.m. and will be in a convenient position for observation in the early part of the night. So also will be Saturn, which will be a fairly bright object rising about an hour and a half after sunset. It will continue its slow retrograde motion in the constellation Pisces. Uranus is likewise moving slowly in a retrograde direction in the constellation Aries. A conjunction with the Moon takes place on September 14, which will afford an opportunity to observers with simple optical aid to locate the planet. A lunar occultation of some interest that can be seen in this country is that of β' Scorpii (magnitude 2.9) which will occur at about 8 p.m. on the night of September 28.

The Milky Way.—There are a number of interesting regions of the galaxy which can be conveniently observed during the month, immediately after sunset. The great star clouds in Sagittarius, the regions in Aquila and Cygnus which are extraordinarily rich in faint stars, are some of the parts of the Milky Way which merit special attention. Side by side, there are the dark holes and rifts in Ophiuchus and other places, regions apparently devoid of stars, which will repay a careful study. In these regions are found extensive dark clouds which obscure the light of stars situated beyond. These dark nebulae are comparatively near the sun, the distances varying from a hundred to a thousand parsecs.

Zeta Aurigae.—This is a well-known eclipsing binary system in which the two components eclipse each other in a period of 973 days. During the two recent eclipses, photometric and spectroscopic observations have been obtained in considerable detail by a number of observers. Some interesting facts have been deduced from a preliminary discussion of the results, which indicate that the two components are not of equal dimensions. The diameter of the larger star is about twenty times that of the smaller, which, in turn, is ten times that of the Sun. The larger star is of Spectral type K and has about fifteen times the Sun's mass while the smaller, of type B has eight times the mass of the sun.

T. P. B.