

ADDRESS AT THE DEDICATION OF THE
ASTRONOMERS' MONUMENT AT THE
GRIFFITH OBSERVATORY, LOS
ANGELES, NOVEMBER 25, 1934

BY W. S. ADAMS

[The astronomers' monument, in front of Griffith Observatory in Griffith Park, Los Angeles, was dedicated on Sunday afternoon, November 25, 1934. The principal address for the occasion, written by Dr. W. S. Adams, Director of the Mount Wilson Observatory, was read, in his absence, by Dr. Frederick C. Leonard, Chairman of the Department of Astronomy of the University of California at Los Angeles. Dr. Leonard said:

Dr. Walter S. Adams, the Director of the Mount Wilson Observatory of the Carnegie Institution of Washington, was scheduled to speak on the significance of the six sculptured figures on the astronomers' monument, and to tell of the principal contributions to the intellectual progress of our race, of each of the six great men of science who are imaged thereon. These dedicatory ceremonies were planned originally for Sunday, November 18, when, on account of rainy weather, they had to be postponed until today. Dr. Adams is unable to be here this afternoon, but he has sent us his address, which I shall read.]

On the occasion of the dedication of a memorial commemorative of the great leaders in astronomical science, two thoughts at once come to our minds. The first is a realization of the enormous influence which the study of the heavens has had upon man, not only as affecting his daily life and activities, but also his views of nature and natural laws and every aspect of his imagination. Our second thought is one of pride in the accomplishments of the human mind which can reach across the vast distances of space, seek out and harmonize the laws which govern the movements of the heavenly bodies, and give us so wide an understanding of the great universe about us.

In every field of science the leaders form a continuous chain passing on from one to another the light of discovery which each has kindled. The six figures which you see upon

this pedestal today form but a part of this series, as old as the human race itself, which has given us our knowledge of the physical world. Each was a great master, combining an insatiable love of discovery with the rare ability to co-ordinate and bring under the control of general laws the almost infinite variety of phenomena in the heavens above him.

We go back more than two thousand years to the first of these great astronomers, Hipparchus of Rhodes, a worthy representative of the most brilliant people which the world has ever known. Uniting rare observational skill with mathematical ability he left us a star catalogue of priceless value, the list of constellations which forms the basis of our own, and the system by which we still classify the brightness of the stars. He laid the foundations of the science of trigonometry and discovered the slow revolution of the Earth's axis which causes the precession of the equinoxes. His work stands out like a beacon light in the darkness of those early years when man was groping dimly toward a knowledge of the physical world about him.

Sixteen centuries later we come to the old monk of the Vistula, Copernicus, whose conception of the Earth and planets as moving in orbits about the Sun produced a far-reaching revolution in human thought. Astronomy had lain nearly dormant throughout the Dark Ages and it was not until the end of the fifteenth century that Copernicus, the pioneer, gave the impulse to its study which moved his great successors, Galileo and Kepler, and culminated in the amazing genius of Newton.

In Galileo we have one of the most interesting and attractive figures in the history of science. A great physicist who first detected the regularity of the pendulum and the laws of falling bodies, we owe to him the discovery of sun-spots, of the mountains on the moon, the phases of *Venus*, and the brighter satellites of *Jupiter* and *Saturn*. He was a stout defender of the Copernican theory that the Earth moves about the Sun as against the still prevalent view of the stationary Earth; and he brought into astronomy the conception of a changing and evolving universe as against one rigid and permanent in time. As one biographer has said, "for over fifty years he was the knight

militant of science," and during much of that period he was old, infirm, and nearly blind. His influence upon the methods of science was enormous. Leonardo da Vinci once compared a scientific discovery to a military victory in which theory is the field marshal, experimental facts the soldiers. As Professor Crew has so cogently observed, "the philosophers who preceded Galileo had, in the main, been trying to fight battles without soldiers."

Kepler was a close contemporary of the great Italian astronomer, Galileo. Born to poverty and ill-health, he became in 1602 chief mathematician at the court of Emperor Rudolph at Prague, and inherited the observational material which his celebrated predecessor, Tycho Brahe, had accumulated. His great contributions to astronomy were the three laws of motion of the planets which placed the Copernican theory on an unshakable basis and ended, permanently in the minds of thoughtful men, the disputes of nearly two thousand years.

It is always difficult to classify the ability of great men, but probably without question Isaac Newton was the most remarkable scientific genius the world has ever seen. His great mind left a profound impression upon every branch of physical science with which he came in contact. He discovered many of the laws of optics and invented the reflecting telescope; he extended existing mathematical processes enormously and, contemporaneously with the great German philosopher and scientist Leibnitz, invented that powerful tool of research, the infinitesimal calculus; and with the aid of his discovery of the single principle of gravitation he formulated and interpreted the whole of the new astronomy which began with Copernicus. No other book in the history of the world has had an influence upon scientific thought in any way comparable with that of Newton's *Principia*. We may say that with the advent of Newton the physical world became a unified and organic whole.

The last of our great astronomers was primarily an observer. To William Herschel more than to anyone else we owe the beginnings of our knowledge of the universe outside the solar system. He catalogued great numbers of stars and nebulae and analyzed in a remarkably accurate way the stellar system within

which we live. He developed greatly the reflecting telescope, discovered the planet *Uranus*, and determined the motion of the Sun in space. The Herschels, brother, sister, and son, may be regarded as the founders of modern physical astronomy.

The memorial which we are dedicating today is not only commemorative of the achievements of these great leaders in astronomy and in human thought, but it is a fitting monument to the gallant and unquenchable spirit of mankind which remains a lasting source of inspiration to our race.